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COMPARE THE EFFECTIVENESS OF CORRECTIVE EXERCISES AND ALEXANDER TECHNIQUE ON PAIN AND QUALITY OF LIFE IN UPPER CROSS SYNDROME AMONG STUDENTS

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Abstract

Background: *Upper Crossed Syndrome (UCS) is a postural condition characterized by abnormalities in the upper body, including increased thoracic kyphosis, rounded shoulders, and a forward head posture. The prevalence of UCS varies significantly, ranging from 11% to 60% across different populations and age group.*

Objective: *The Objective was to Compare the effectiveness of Corrective Exercises and Alexander Technique on Pain and Quality of Life in Upper Cross Syndrome among Students.*

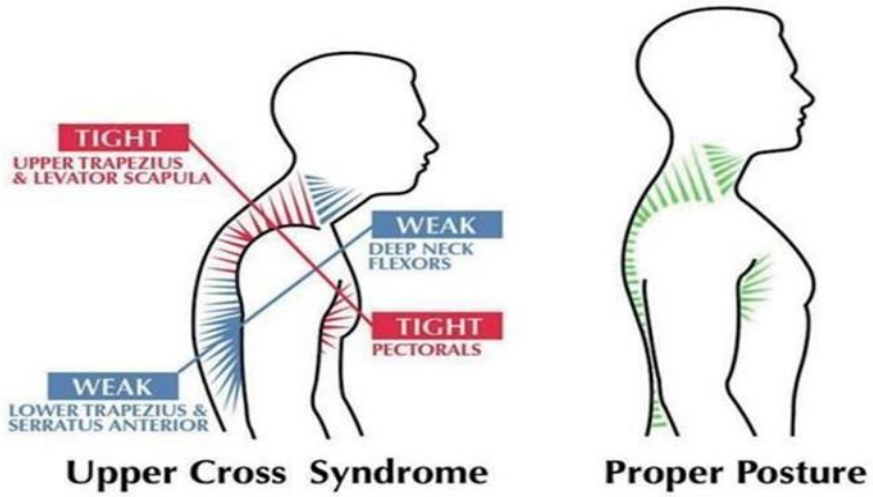
Methodology: *Twenty-two males and females aged 18 – 25 years having upper cross syndrome over 6 weeks and positive Neck test and Flesche test were participated in this study. The study was conducted in Rehab Max clinic for a period of three months. The study participants were divided into two groups, Group A received corrective exercises, while Group B received Alexander technique. Pain intensity and quality of life were measured using Numerical Pain Rating Scale, and Quality of Life (SF-12) respectively at baseline, 3rd week and 6th week. Data was analyzed using SPSS version 24.*

Results: *The results showed a significant difference at 3rd week and 6th week values for all outcome variables. The findings of current study found to be significant (p = < 0.05) within group analysis (Friedman test) and between group analysis (Man Whitney Test).*

Conclusion: *Alexander Technique found to be very effective in decreasing pain intensity and improving quality of life with upper cross syndrome among students.*

INTRODUCTION

Upper cross syndrome is caused by weak lower and middle trapezius, tight upper trapezius and levator scapulae, weak deep-neck flexors, tight sub occipital muscles and sternocleidomastoid, weak serratus anterior and tight pectoralis major and minor. The syndrome mainly arises as a result of muscular imbalance that usually develops between tonic and weak muscles. There are two types of muscles present in our body – the postural muscles such as pectoralis major, upper trapezius, and sternocleidomastoid and other phasic muscles such as deep-neck flexors, and lower trapezius. Predominantly static or postural muscles have a tendency to tighten. In various movements, they are activated more than the muscles that are predominantly dynamic and phasic in function, which have a tendency to develop weakness. Opposite group muscle imbalances in upper crossed syndrome give rise to postural disturbance. [1]



The muscles in the upper back and neck, such as the serratus anterior, rhomboids, deep neck flexors (DNFs), and middle and lower trapezius (MT and LT), are tightened or shortened in upper cervical spondylosis (UCS), while the muscles in the upper chest and neck, such as the suboccipitalis, sternocleidomastoid, levator scapulae, pectoralis major and minor, scalenes, and upper trapezius (UT), are either shortened or tightened. On the back side, the suboccipitalis, levator scapulae, and UT are stronger than the pectoralis major and minor, SCM, and scalenes; on the front side, the DNFs are stronger than the SA, rhomboids, MT, and LT. When there is an imbalance between the groups of muscles that work together in UCS, it can lead to postural problems, misalignments in the upper limbs, and problems with the atlanto-occipital, cervicothoracic, and glenohumeral joints. Muscle imbalances can lead to a plethora of musculoskeletal symptoms, such as headaches, soreness in the neck, chest, and upper back, tingling in the upper arms, and limited range of motion in the neck or shoulders. [2]

Further research has shown that UCS can set off a chain reaction of problems in other parts of the body, such as the lower limbs. For instance, if there's a shift in thoracic hyper-kyphosis and cervical hyper-lordosis, it can lead to an increase in lumbar hyper-lordosis, which in turn affects the muscles in the back and front of the thighs. So, to fix UCS and avoid other problems, it's crucial to pick the ideal workouts. Games, strength training, stretching, shoulder-specific exercises, generalized exercises, and shoulder-specific exercises are some of the therapeutic exercises that have been studied for this problem and their effectiveness. [3]

Upper Crossed Syndrome (UCS) is a postural condition characterized by abnormalities in the upper body, including increased thoracic kyphosis, rounded shoulders, and a forward head

posture. The prevalence of UCS varies significantly, ranging from 11% to 60% across different populations and age groups. This syndrome affects the upper body and is attributed to multiple factors. [3] UCS results in muscle imbalances, where certain muscles, such as the levator scapulae, sternocleidomastoid, and pectoralis muscles, become tight, while others, including the cervical flexors and serratus anterior, become weak. These muscle imbalances disrupt normal postural alignment, leading to functional limitations. [4]

With the growing trend of sedentary lifestyles, especially due to technological advancements, prolonged periods of static postures—such as sitting in front of a computer for extended hours—have become more common. Research suggests that maintaining such positions over long durations may contribute to postural misalignments, thus increasing the risk of work-related musculoskeletal disorders (WMSDs). These disorders can lead to complaints among office workers, including neck and shoulder pain, headaches, chronic tension, and scapular dyskinesia, all of which can negatively affect work performance and overall daily activities. [5]

Prolonged poor posture is the primary risk factor for developing Upper Crossed Syndrome (UCS). Many activities that contribute to bad posture are related to work. Postural issues can worsen with extended or repetitive labor. For example, individuals with poor posture are more prone to musculoskeletal injuries when lifting or moving heavy objects compared to those who maintain proper posture. [6]

Studies also show that postural issues are prevalent among university students, with a high incidence of abnormalities such as scapula-pelvic asymmetry (97%), cervical hyperlordosis (85.7%), forward torso posture (74.2%), lumbar hyperlordosis (65.7%), and even scoliosis tendencies in 100% of the cases. During puberty, when the body undergoes significant growth and hormonal changes, posture is particularly susceptible to alterations. Without timely intervention, these postural changes can lead to structural deformities, further exacerbating physical discomfort and impairment. [7]

Poor posture during adolescence can also lead to physiological complications, such as increased thoracic kyphosis. This abnormal curvature in the upper back may impair respiratory function by restricting chest muscle flexibility and weakening expiratory muscles. The resulting reduction in ribcage volume further limits lung capacity, which can have long-term negative effects on overall health. [8]

Although several conventional treatments for Upper Crossed Syndrome (UCS) exist—such as physical therapy, manual therapy, and pharmacological interventions—this technical note focuses on introducing the mesotherapy protocol as a novel treatment option. Traditional approaches tend to manage symptoms, whereas this protocol directly targets muscle imbalances and postural deviations. The mesotherapy protocol is a new treatment approach specifically targeting muscular imbalances associated with Upper Crossed Syndrome. While mesotherapy as a technique has been used in other contexts, its application to UCS and the specific injection points described in this protocol are novel. [9]

Corrective Exercise Specialization (CES), developed by the National Academy of Sports Medicine (NASM), provides a structured approach for fitness professionals to assess and address movement dysfunctions, muscular imbalances, and postural abnormalities in their clients. Research has demonstrated that corrective exercises, particularly those based on NASM principles, can significantly improve spinal curvatures and posture. Another approach, the Alexander Technique (AT), is a well-established physical method aimed at increasing body awareness and improving movement patterns. The Alexander Technique focuses on education rather than treatment, guiding individuals to become aware of their body's sensory-motor state and helping them replace habitual, inefficient movement patterns with more balanced and effective ones. This technique has shown to be highly effective in improving balance and is recommended for individuals in UCS to enhance their overall posture and well-being. [10]

RATIONALE

Through the provision of evidence-based data on the comparison of corrective exercise and the Alexander technique, this study will assist physicians in making more informed clinical decisions and will bring about improvements in the treatment outcomes for Upper Cross Syndrome. In addition, it will enhance patient care and outcomes, bring about an increase in the number of treatment alternatives available, and assist in selecting the most appropriate alternative. A comparison of Alexander Techniques and Corrective Exercises will also be possible as a result of the findings of the study, which will help direct the formulation of guidelines for the most effective practices for students who have Upper Cross Syndrome.

LITERATURE REVIEW

A systemic review based on various exercise protocol in the improvement of upper cross syndrome was in 2025 by Kaur et al, reviewing the impact of different exercise regimens on the amelioration of upper crossed syndrome is the goal of this study. Specialized databases such as PubMed, WOS, Scopus, SID, Magiran, ISC, Science Direct, JCR, and Google Scholar were searched. In the end, ten publications that addressed various exercise regimens for people with upper crossed syndrome were found and reviewed. Six studies examined how different exercise regimens affected the improvement of posture in people with upper crossing syndrome, showing that these activities help people achieve good posture. Furthermore, four studies examined the effects of various exercise regimens on improving both static and dynamic balance in people with upper crossed syndrome, showing that these regimens significantly improved both static and dynamic balance. The results of this review study demonstrate how well remedial exercises work to reduce upper crossing syndrome. [11]

Jeong, G. H., et al., in 2024 conducted this study to investigate the effects of telerehabilitation, combining diaphragmatic breathing re-education and shoulder stabilization exercises, on young men with upper crossed syndrome during the COVID-19 pandemic over 4 weeks. The study included 37 participants aged in their 20s and 30s who were randomly divided into two groups. The experimental group received diaphragmatic breathing re-education and shoulder stabilization exercises, while the control group only underwent shoulder stabilization exercises. Both groups were trained three times a week for four weeks using telerehabilitation. The comparison of within-group pre–post differences in the experimental and control groups were conducted using a paired *t*-test, while the effects of treatment were assessed using repeated-measures analysis of variance. After 4 weeks, both groups showed significant improvements in the pain pressure threshold of the upper trapezius, craniovertebral angle, round shoulder posture, shoulder tilt degree, neck disability index, and closed kinetic chain upper extremity stability test (all $p < 0.05$). The results showed a significant difference between the Time effect ($p\ adj < 0.05/4$) for both sides of PPT, CVA, and STD and both sides of RSP, NDI, and CKCUEST, and an interaction between the Time × Group effects ($p\ adj < 0.05/4$) for the Rt. PPT, CVA, and STD. These findings suggest that the telerehabilitation training group, which included diaphragmatic breathing re-education and shoulder stabilization exercises, was more effective in improving Rt. PPT, CVA, and STD in males with UCS. [12]

The purpose of the study by Potter, et al., in (2024) was to find out the efficacy of dynamic postural exercise developed on the basis of identification of muscle activation pattern in UCS. Patients suffering from UCS 14 subjects with diagnosed UCS were randomly allocated to experimental and control groups (N=14; n=7). Participants were asked to perform 4 exercises (YTWL) using elastic resistance band during which amplitude of muscle activation and co-contraction ratio with Surface electrodes using 4 channel electromyography systems were measured. 12 muscles of both side (Upper, middle and lower trapezius, serratus anterior, pectoralis major, anterior scalene) were assessed. The intervention of experimental group consisted of seven exercises. Both groups were given hot

pack, TENS and cervical AROM exercises. The intervention was prescribed for three days a week for 8 weeks. Cervical kinaesthesia was measured using joint position sense error (JPSE) test. All the outcome variables were recorded at the baseline and after 8 weeks. Statistically significant difference ($p \leq 0.05$) of mean amplitude in pre-post values of experimental group as well as between groups was found. Between group analysis of UT: LT, SC:AS contraction ratio and joint position sense also found to be significant($p \leq 0.05$). There was a significant improvement in mean amplitude and cocontraction of cervicothoracic muscles in Dynamic Postural Exercise group. Kinesthesia also improved in experimental group. A focused rehabilitation program for UCS will help in improving the quality of life and functional efficacy. [13]

Karkousha, et al., in 2024 conducted a study to investigate the outcomes of Pilates exercise compared to traditional treatment for the management of upper cross syndrome (UCS). Forty female participants with UCS were randomly divided into two equal groups: group A (control group) and group B (experimental group). Both groups received two sessions per week for four consecutive weeks. Group A received a traditional physical therapy program consisting of stretching, strengthening, and postural correction exercises, while group received a Pilates exercise program. Primary outcome measures were balance, spinal curvature, craniovertebral (CV) angle, and rounded shoulders, while the Neck Disability Index and Visual Analogue Scale served as secondary outcome measures. Measurements were recorded before and after treatment. A comparison of pre- and post- treatment test results showed that all dependent variables significantly improved for both groups ($p > 0.001$). However, Pilates exercise resulted in greater improvement in terms of balance, spinal curvature, CV angle, and pain ($p > 0.001$).Conclusions. The Pilates exercise program proved more effective than the traditional physical therapy program in improving spinal curvature, balance, and function, and in reducing pain in UCS. [14]

De Jesus Correia,et al., in 2024, examined the association between smartphone use and musculoskeletal pain in the upper limbs and neck, as well as to observe the relationship in between smartphone addiction and musculoskeletal pain and upper limb function in university students. It is a cross-sectional, analytical study. A total of 165 university students participated in the research. Each student had their own smartphone. The students answered a structured questionnaire about pain in the upper limbs and neck; the Smartphone Addiction Inventory (SPAI) and the Disabilities of the Arm, Shoulder, and Hand questionnaire (DASH). Prevalence of neck and upper limb pain was 34.0%. Smartphone addiction and its use to play games and listen to music were risk factors to upper limb pain. Moreover, the smartphone addiction and age proved to be risk factors to neck pain. There was correlation between DASH and SPAI scores, and there was association between DASH score and neck and upper limb pain. Being of the female sex and smartphone addiction predicted the risk of incapacity development. We found association between neck and upper limb pain with smartphone addiction. Functional incapacity was associated to neck and upper limb pain. It was predicted by smartphone addiction and being of the female sex. [15]

Sepehri, et al., in 2024 aimed to evaluate the impact of therapeutic exercises on Upper-Crossed Syndrome (UCS). The study utilized a systematic review and meta-analysis approach to investigate the effects of various therapeutic exercises on forward head posture, rounded shoulders, and hyper kyphosis associated with upper crossed syndrome. Methods The study identified relevant keywords for each independent and dependent variable and conducted a search in scientific databases, including PubMed, Web of Science, Scopus, and Google Scholar, without any time limitations until 12 August 2023. Overall, 4625 articles were found in the selected databases, which were reduced to 1085 after being entered into the EndNote software and removing duplicate data. The full texts of 30 remaining studies were reviewed; ten articles meeting the

criteria were included. Additionally, 12 studies from the Google Scholar database were included, resulting in 22 studies. Using Comprehensive meta-analysis software (CMA ver 3), data heterogeneity was measured with I2 and the Q tests. The Funnel Plot and Egger test methods were utilized to determine the possibility of publication bias. The JBI checklist was used to assess the quality of the studies. The results of the meta-analysis showed that therapeutic exercises were effective in improving forward head, rounded shoulders, and thoracic kyphosis angles (CI 95% = -1.85–1.161, P=0.001, P=0.001, CI95%=-1.822–1.15, and P=0.001, CI 95%= -1.83–1.09,
respectively). Based on the results, it appears that performing therapeutic exercises in the form of strength exercises, stretching, shoulder-based exercises, and incredibly comprehensive exercises that target all muscles may be effective in reducing forward head, rounded shoulders, thoracic kyphosis, and overall UCS. [3]
Firouzjah, M. H. et al., in 2023 conducted the study to evaluate the effect of a course of selected corrective exercises on posture, scapula-humeral rhythm and performance of adolescent volleyball players .30 adolescent volleyball players with upper cross syndrome were purposefully selected and assigned into 2 control and training groups. The degree of back curvature was evaluated using a flexible ruler, forward head and forward shoulder size by photographic method, scapula-humeral rhythm by Lateral Scapular Slide Test (LSST), and performance by closed kinetic chain test. The training group performed the exercises for 10 weeks. After the exercises, the post-test was administered. To analyse the data, analysis of co-variance tests and paired t-test at the level of 0.05 were employed. The research results showed that corrective exercises have a significant effecton abnormalities of forward head, forward shoulder, kyphosis, scapula-humeral rhythm and performance. Corrective exercises can be effective in reducing shoulder girdle and spine abnormalities and improving scapula- humeral rhythm and performance of volleyball players. [16]

3.1 OBJECTIVE

Compare the effectiveness of Corrective Exercises and Alexander Technique on Pain and Quality of Life in Upper Cross Syndrome among Students.

3.2HYPOTHESIS

3.2.1 NULL HYPOTHESIS

There was no significant difference in the effectiveness of Corrective Exercises and Alexander Technique on pain and quality of life in upper cross syndrome among students.

3.2.2 ALTERNATE HYPOTHESIS

There was a significant difference in the effectiveness of Corrective Exercises and Alexander Technique on pain and quality of life in upper cross syndrome among students.

MATERIAL & METHODS

4.1 STUDY DESIGN

The Study Design was Randomized Clinical Trial.

4.2 SETTING

The data was collected from Rehab Max Physiotherapy Clinic Layyah.

4.3 DURATION OF THE STUDY

The study was completed in 3 Months after the approval of synopsis.

4.4 SAMPLE SIZE

The calculated sample size considering Quality of Life as an outcome measure was 11 in each group by using OPEN EPI online software. [17]

Sample Size For Comparing Two Means

Input Data

Confidence Interval (2-sided)	95%		
Power	80%		
Ratio of sample size (Group 2/Group 1)	1		
	Group 1	**Group 2**	**Difference***
Mean	67.68	71.24	-3.56
Standard deviation	3.111	2.805	
Variance	9.67832	7.86803	

Sample size of Group 1	11
Sample size of Group 2	11
Total sample size	22

*Difference between the means

Results from OpenEpi, Version 3, open source calculator--SSMean
Print from the browser with ctrl-P
or select text to copy and paste to other programs.

4.5 STUDY GROUPS

Group A: The Group A was received Corrective Exercises.

Group B: The Group B was received Alexander Technique.

4.6 SAMPLING TECHNIQUE

Non-Probability Purposive Sampling Technique was used for this study.

4.7 SAMPLE SELECTION

4.7.1 INCLUSION CRITERIA

- Both gender male and female. [18]
- Age is between 18-25years. [19]
- Positive Neck Endurance Test [20]
- Flesche Test Positive [21]
- A score greater than or equal to 4/10 on Numeric Pain Rating Scale (NPRS). [22]
- Students experiencing neck pain due to active trigger points [23]
- Had a duration of disease >6 months [23]

4.7.2 EXCLUSION CRITERIA

- History of Cervical trauma. [24]
- Signs of radiculopathy or myopathy. [18]
- PIVD (Prolapsed Intervertebral Disc) at the cervical region. [18]
- Subjects who have Psychiatric disorder. [21]

4.8 DATA COLLECTION TOOL

- Numeric Pain Rating Scale (NPRS)
- SF-12 Questionnaire [26]

4.8.1 NUMERIC PAIN RATING SCALE (NPRS) [25]

It is a pain measuring scale, an 11-point numerical scale ranges from 0 as no pain-to 10 as worst pain. The common format is a horizontal bar or line.

4.8.2 SF-12 QUESTIONNAIRE [26]

Quality of life is measured by Short Form-12 (SF-12). Component analyses showed that there are two distinct concepts measured by the SF-12: a physical dimension, represented by the Physical Component Summary (PCS), and a mental dimension, represented by the Mental Component Summary (MCS). All scales do contribute in different proportions to the scoring of both PCS and MCS measures.

Scores range from 75 to 100 = indicating Good physical and mental health functioning

Scores range from 50 to 74= indicating Average physical and mental health functioning

Scores range from 0 to 49= indicating Poor physical and mental health functioning

4.9 ETHICAL CONSIDERATIONS

The rules and regulations set by Ethical committee of GC University Faisalabad Layyah Campus were followed by conduction the

research and the rights of the research participants were respected.

- Written informed consent (attach) was taken from all the participants.
- All information and Data collection kept confidential.
- Participants were remained anonymous throughout the study.
- The subject was informed that there is no disadvantage or risk on the procedure of the study.
- We did everything to protect their privacy. Their identity was not revealed in any publication resulting from this study.
- Their Participation in this research study was voluntary. They might choose not to participate and they may withdraw, their consent to participate any time. They were not penalizing in any way should you decide not you participate or to withdraw from this study

4.10 DATA COLLECTION PROCEDURE

The data was collected after the approval of the ethical committee of GCUF Layyah Campus. The Subjects who met the inclusion criteria were allocated for this study. Participants assessed in terms of pain and quality of life using NPRS and QoL Scale respectively. The Neck Endurance Test was used to measure neck pain and neck flexors endurance. The Flesche Test was used to check Thoracic Kyphosis and Cervical mobility. The subjects who met the inclusion criteria were randomized into two equal groups, Group A & Group B by Lottery Method. The study was double blinded**.** Data was collected at Baseline, 3rd week and 6th week. Participants had received baseline treatment with heating pad to reduce pain and then later treatment was provided according to the allocated groups, Group A (Corrective Exercises group) and Group B (Alexander Technique). All study participants had received a total of 18 treatments sessions over a 6th-week period, which consisted of 03 treatment sessions per week.

INTERVENTIONS

Baseline Treatment:

At the beginning of each treatment session, both groups had received Heat Pad and TENS for 10 minutes. Total duration for each session with intervention was 35-40 minutes.

Corrective Exercises (Group A):

The Corrective Exercise Specialization (CES) program by the National Academy of Sports Medicine (NASM) equips fitness professionals to evaluate and address movement dysfunctions, muscular imbalances, and posture- related concerns in their clients. Studies showed that CE based on NASM principles can improve abnormal spinal curvatures and teaching proper posture can significantly reduce these abnormalities. The CE exercises were taken in the clinic with Physiotherapist overseeing their execution. The selected exercises were specifically design to improve posture and addressed the recognized abnormalities by targeting muscle imbalances. The regime included Stretching exercises for Shortened muscles (Pectorals muscles, upper trap. Levator Scapulae and SCM) and Strengthening exercises for Weak muscles (Deep NECK flexors, Lower Trapezius and Rhomboids). The routine Physical therapy was begun with 5–10-minute warm-up, was followed 35-40 minutes by Stretches for the chest, Upper Trapezius, Intercostal muscles, and Upper neck extensors. It was then transitioned to Strengthening exercises for the shoulder protractors, deep neck flexors, lower neck extensors, and thoracic. [10]

Alexander's Technique (Group B):

The Alexander technique training protocol was to increase body awareness, correct inappropriate movement habits, and help participants function correctly in daily activities. During the experimental condition, the participants were taught the Alexander technique using manual guidance, and verbal, visual, and proprioception feedback. In the first two sessions, we concentrated on the participants' familiarity with the Alexander technique, explaining goals, and identifying their weak physical habits and

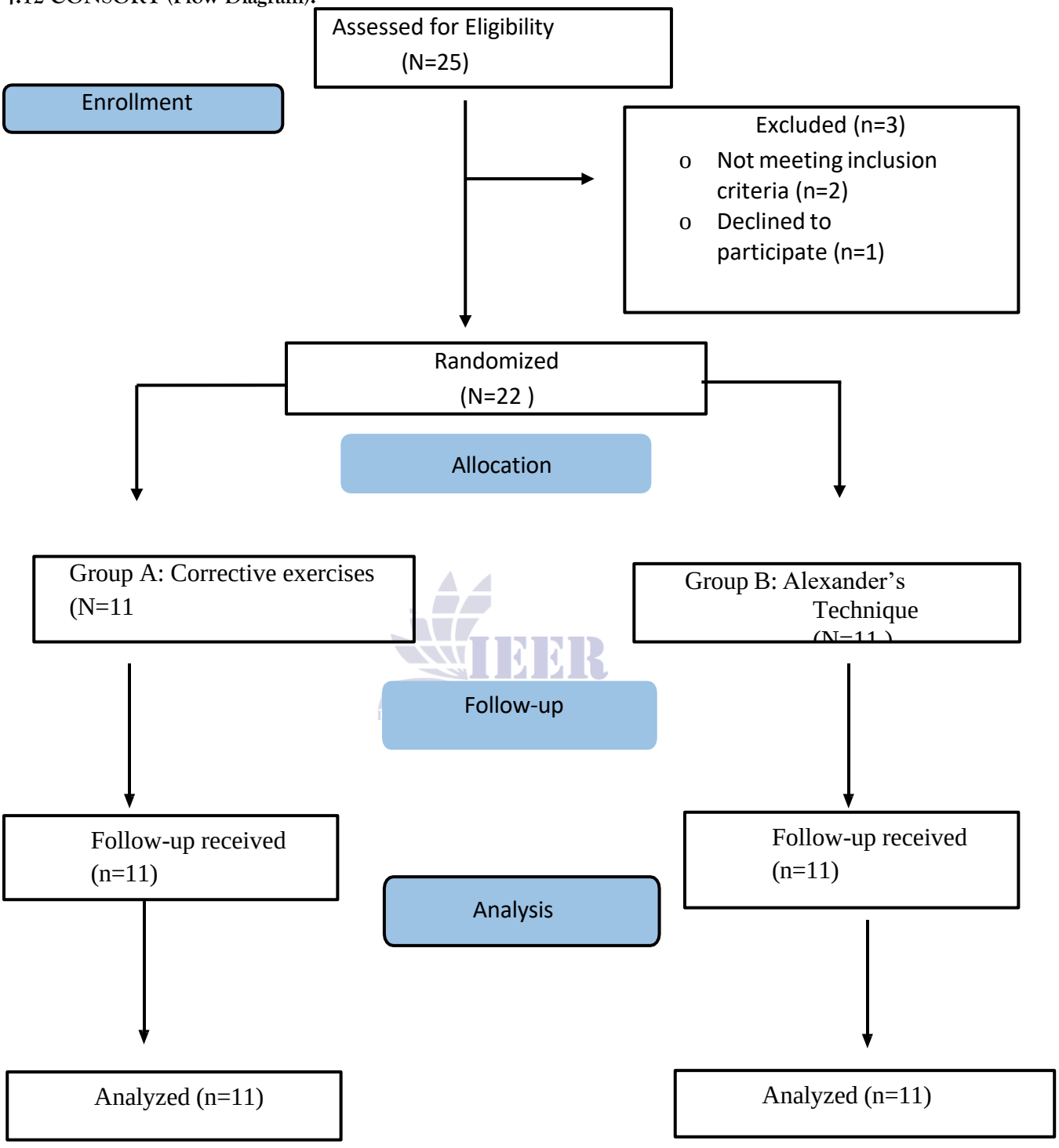
inefficient movement patterns. In the following sessions, we instructed the participants about the following items: a) The correct way to hold the head, neck, and spine while sitting, standing, and walking; b) The correct way to sit and stand up; c) The correct way to sit and lift objects; d) The correct way to work in a bent position; e) The correct way to carry bags and equipment; f) The correct posture when writing and reading; g) The correct expressions of the face and eyes; and h) The correct way of breathing . During these sessions, the participants were tried to familiarize themselves with the basic concepts of Alexander's technique, including inhibition, primary control, and direction, in addition to correcting wrong body habits and improving movement patterns. They will also ask to apply the acquired knowledge in their daily activities.

It utilized a teacher-student model to enable the students to become aware of their body's sensory-motor condition and to change their habitual faulty movement patterns. The primary focus of this technique was on education rather than treatment. In the AT group, parents helped to supervise the students' home exercises based on guidance and training was provided by the Physical therapist during the initial session. Parents and teachers were responsible for reporting how they had implemented these strategies and play a crucial role by reminding the patients about correct posture through specific verbal cues throughout the day. A poster illustrating proper posture while standing, sitting, and lying down had created and available to participants. This poster was placed in a convenient spot at home, which had served a regular reminder for students to maintain correct posture. The total duration of this technique was 35-40 minutes. [17]

4.11 DATA ANALYSIS PROCEDURE

The data entered and analysed using SPSS Version 24. The numerical data as age was presented in the form of mean ± SD. Categorical Data like gender group: male and female was presented in the form of frequency (Percentage). After checking the normality of data, Friedman Test was used to determine Comparison of Corrective Exercises and Alexander Exercises in-patient with Upper Cross Syndrome. Man Whitney Test was used to apply to compare the outcomes at baseline, at 3th week and 6th week. Confidence interval (CI) was 95%. P- Value of less than and equal to 0.05 was considered significant.

4.12 CONSORT (Flow Diagram):



CHAPTER 5
RESULTS

5.1 Normality tests for data

The statistical analysis was done by using Statistical Package for social sciences (SPSS) version 24. Before conducting inferential and descriptive statistics, normality of the collected data was checked. The Shapiro-Wilk test and Kolmogorov-Smirnov (K-S) used widely to check the normality of data.

Table 5.1: Shapiro-Wilk test and Kolmogorov-Smirnov for NPRS, MCS-12 and PCS-12

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
NPRS at Baseline	.208	22	.014	.909	22	.046
NPRS at 3rd Week	.206	22	.016	.882	22	.013
NPRS at 6th Week	.244	22	.001	.843	22	.003
MCS-12 at Baseline	.253	22	.002	.813	22	.001
MCS-12 at 3rd Week	.221	22	.006	.823	22	.001
MCS-12 at 6th Week	.187	22	.044	.913	22	.054
PCS-12 at Baseline	.234	22	.003	.808	22	.001
PCS-12 at 3rd Week	.188	22	.042	.883	22	.014
PCS-12 at 6th Week	.238	22	.002	.797	22	.000

The above normality tests determine whether a sample of randomly chosen data is normally distributed or not. The above table shows p-values of Kolmogorov-Smirnov and Shapiro-Wilk tests for all the variables is less than 0.05, it means data was not normally distributed.

5.2 Age of participants

Table 5.2.1: Frequency distribution of patient's age

Age of Patients				
Age in Years	Frequency	Percent	Valid Percent	Cumulative Percent
18	2	9.1	9.1	9.1
19	3	13.6	13.6	22.7
20	5	22.7	22.7	45.5
21	2	9.1	9.1	54.5
22	2	9.1	9.1	63.6
23	4	18.2	18.2	81.8
24	3	13.6	13.6	95.5
25	1	4.5	4.5	100.0
Total	56	100.0	100.0	

Above table shows frequency distribution of age of participants included in the study; total number of patients recruited for study was twenty-two aged between 18-25 years.

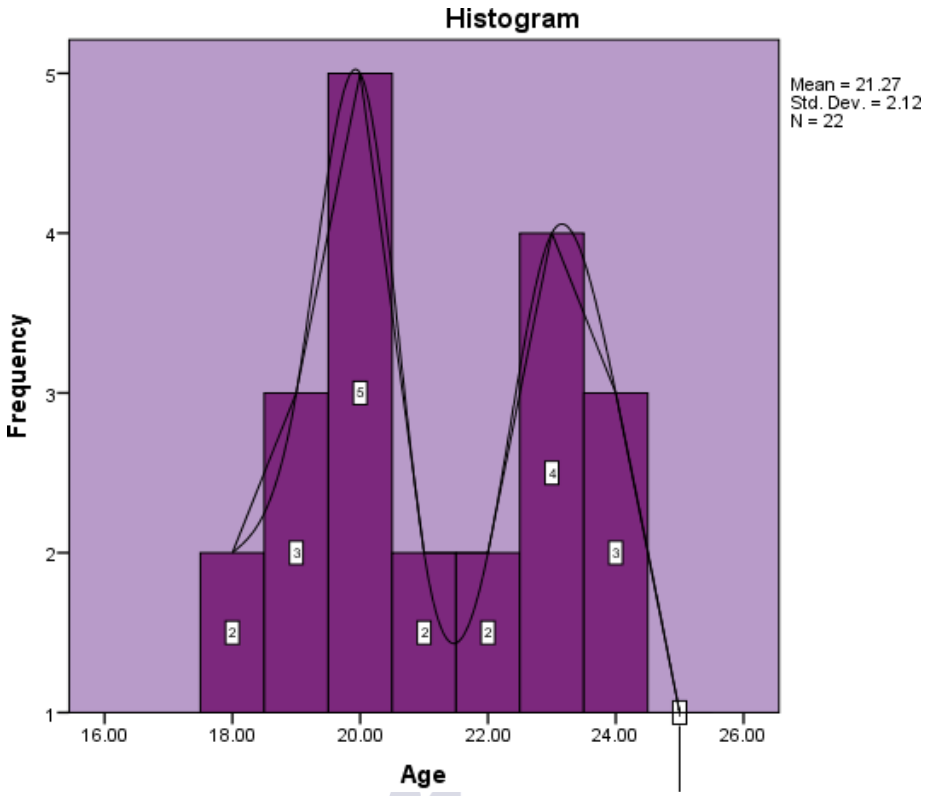


Figure 5.1: Histogram shows age of patient

The above histogram shows age of participants, total 22 participants recruited in the study included upper crossed patients aged between 18 to 25 years. The histogram shows 10 patients lie between age group 18-20, 8 patients between 21-23 years, and 4 patients between 24-25 years of age.

5.2.2 Descriptive Statistics of Age

Table 5.2.2 a: Descriptive statistics of Age Group A

Descriptive statistics					
Group A	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Corrective Exercises Group	22	18	25	21.81	2.27

The above table shows descriptive statistics of age in Group A (Corrective Exercises Group). The maximum age of patient in this group was 40 and minimum age was 18 years. The mean age of participants in Group A was 21.81 with standard deviation 2.27.

Table 4.2.2 b: Descriptive statistics of Age Group B

Descriptive statistics					
Group B	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Alexander Technique Group	22	18	25	20.72	1.90

The above table shows descriptive statistics of age in Group B (Alexander Technique Group). The maximum age of patient in this group was 39 and minimum age was 18 years. The mean age of participants in Group A was 20.72 with standard deviation 1.90

5.3 Gender of participants

Table 5.3: Frequency distribution of gender

Gender of Patients				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Male	12	54.5	54.5	54.5
Female	10	45.6	45.5	100
Total	22	100	100	

The table above shows the frequency distribution of participant's gender from age 18 to 40 years. In this study, total number of participants were twenty-two included 12 males (54.5%) and 10 females (45.6%).

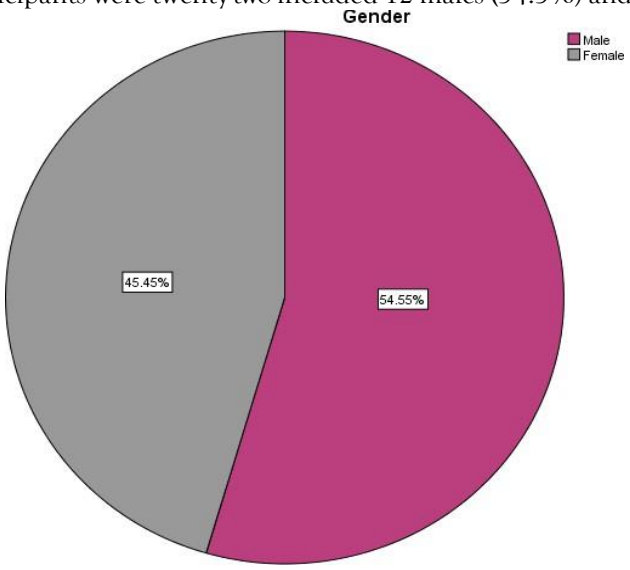


Figure 5.2: Pie Chart shows gender distribution

The above pie chart shows the patient's gender distribution. The total sample of 22 participants included 12 males and 10 females with percentage of 54.5% and 45.64% respectively.

5.4 Treatment groups

Table 5.4: Frequency distribution of patients in treatment groups

Treatment Groups				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Group A (Corrective Exercises Group)	11	50.0	50.0	50.0
Group B (Alexander Technique Group)	11	50.0	50.0	100.0
Total	22	100.0	100.0	

Above table shows the frequency distribution of participants in two treatment groups. The total sample size of patients was 22 which were equally divided into two groups, 11 participants (50%) in Group A and 11 participants (50%) in Group B.

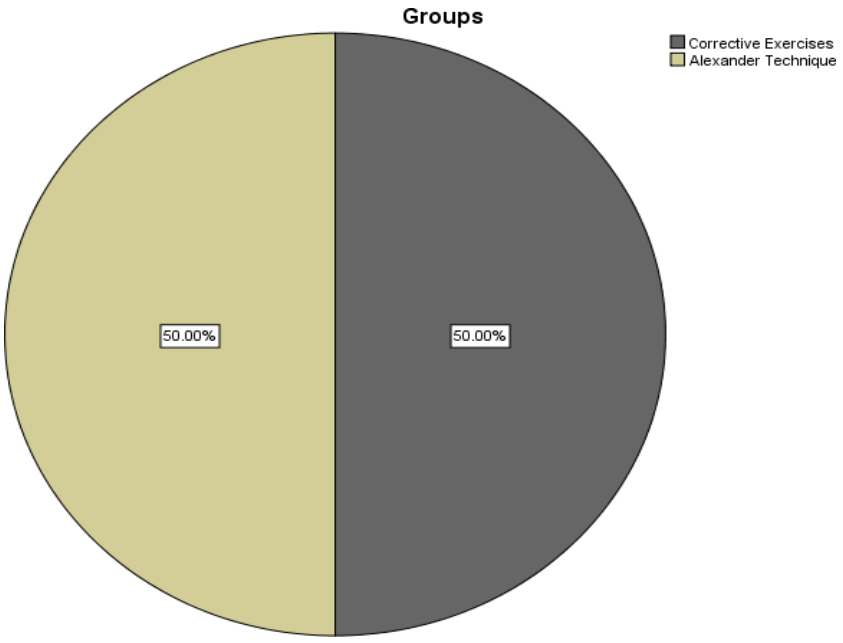


Figure 5.3: Pie chart shows participants distribution between groups

The above pie chart shows equal distribution of patients into two groups, 50% participants in group A and 50% in group B.

5.5 Statistics for within Groups analysis

Table 5.5.1. Within group comparison for Numeric Pain Rating Scale (Corrective Exercises Group A)

Outcome measure	N	Mean Rank	Mean (SD)	Chi- Square	Df	Asymp. Sig.
Numeric		2.64	6.81(			
Pain			1.25)			
Rating						
Scale at						
Baseline						
Numeric	11	2.09	6.18	11.69	2	.003
Pain			(.07)			
Rating						
Scale at						
3rd Week						
Numeric		1.27	5.27			
Pain			(.64)			
Rating						
Scale at						
6th Week						

The above table shows the results of Friedman test used for within group analysis of Group A for Numeric Pain Rating Scale. The results show there was significant difference between scores of NPRS from baseline to

6th week scores. The resulted p-value is .003 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

Table 5.5.2. Within group comparison for Mental Component Summary-12 (Corrective Exercises Group A)

Outcome measure	N	Mean Rank	Mean (SD)	Chi- Square	Df	Asymp. Sig.
Mental		2.77	56.90			
Componen			(			
t			9.51)			
Summary-						
12 at						
Baseline	11			13.76	2	.001
Mental		2.00	55.54			
Componen			(8.82)			
t						
Summary-						
12 at 3rd						
Week						
Mental		1.23	54.00			
Componen			(8.31)			
t						
Summary-						
12 at 6th						
Week						

The above table shows the results of Friedman test used for within group analysis of Group A for Mental Component Summary-12 scale. The results show there was significant difference between scores of MCS from baseline to 6th week scores. The resulted p-value is .001 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

Table 5.5.3. Within group comparison for Physical Component Summary-12 (Corrective Exercises Group A)

Outcome measure	N	Mean Rank	Mean (SD)	Chi- Square	Df	Asymp. Sig.
Physical		1.41	36.00			
Componen			(			
t			9.81)			
Summary-						
12 at						
Baseline	11			7.65	2	.002
Physical		2.05	37.18			
Componen			(8.99)			
t						
Summary-						
12 at 3rd						
Week						
Physical		2.55	38.00			

Componen			(8.46)			
t						
Summary-						
12 at 6th						
Week						

The above table shows the results of Friedman test used for within group analysis of Group A for Physical Component Summary-12 scale. The results shows there was significant difference between scores of MCS from baseline to 6th week scores. The resulted p-value is .002 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

Table 5.5.4. Within group comparison for Numeric Pain Rating Scale (Alexander Technique Group B)

Outcome measure	N	Mean Rank	Mean (SD)	Chi- Square	Df	Asymp. Sig.
Numeric		2.91	6.54 (			
Pain			.68)			
Rating						
Scale at						
Baseline						
Numeric	11	2.09	5.27	21.14	2	.000
Pain			(.78)			
Rating						
Scale at						
3rd Week						
Numeric		1.00	2.09			
Pain			(.53)			
Rating						
Scale at						
6th Week						

The above table shows the results of Friedman test used for within group analysis of Group B for Numeric Pain Rating Scale. The results show there was significant difference between scores of NPRS from baseline to 6th week scores. The resulted p-value is .000 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

Table 5.5.5: Within group comparison for Mental Component Summary-12 (Alexander Technique Group B)

Outcome measure	N	Mea n Rank	Mean (SD)	Chi- Squar e	D f	Asymp . Sig.
Mental		3.00	55.36 (			
Componen			11.65)			
t						
Summary-						
12 at						
Baseline	1			21.53	2	.000
Mental	1	1.95	51.36			

Componen			(10.99			
t			)			
Summary-						
12 at 3rd						
Week						
Mental		1.05	46.90			
Componen			(9.28)			
t						
Summary-						
12 at 6th						
Week						

The above table shows the results of Friedman test used for within group analysis of Group B for Mental Component Summary-12 scale. The results shows there was significant difference between scores of MCS from baseline to 6th week scores. The resulted p-value is .000 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

Table 4.5.6. Within group comparison for Physical Component Summary-12 (Alexander Technique Group B

Outcome measure	N	Mean Rank	Mean (SD)	Chi- Square	Df	Asymp. Sig.
Physical		1.14	40.63			
Componen			(			
t			8.67)			
Summary-						
12 at						
Baseline	11			19.86	2	.000
Physical		1.86	55.09			
Componen			(6.33)			
t						
Summary-						
12 at 3rd						
Week						
Physical		3.00	69.72			
Componen			(4.19)			
t						
Summary-						
12 at 6th						
Week						

The above table shows the results of Friedman test used for within group analysis of Group B for Physical Component Summary-12 scale. The results shows there was significant difference between scores of MCS from baseline to 6th week scores. The resulted p-value is .000 that is less than 0.05, hence the results suggested that intervention showed significant improvement within study duration of six week.

5.6 Statistics for between Groups analysis

5.6.1 Mann Whitney test for Numeric Pain Rating Scale

Outcom e measur e	Group s	Mea n Ran k	Sum of Rank s	Mea n (SD)	Z-valu e	Asymp. Sig.(2-tailed)
NPRS	Group	12.3	136.0	6.68	-.657	.511
at	A	6	0	(.99)		
Baselin						
	Group	10.6	117.0			
e	B	4	0			
NPRS	Group	14.7	162.5	5.72	-	.013
at 3rd	A	7	0	(.93)	2.47	
week					9	
	Group	8.23	90.50			
	B					
NPRS	Group	17.0	187.0	3.68	-	.000
at 6th	A	0	0	(1.72	4.12	
week				)	7	
	Group	6.00	66.00			
	B					

The above table shows mean ranking between interventional sessions of Group A and Group B. There was significant difference between groups, Group B showed more improvement in numeric pain rating scale scores as compared to Group A. At baseline the p-value of NPRS was .511 which is more than α=0.05, that was non-significant. After six week on intervention, the resulted p-value was (.000) that was significant as compared to α=0.05. The statistical analysis showed there was significant difference exist between the groups, after six weeks of interventional period.

5.6.2 Mann Whitney test for Mental Component Summary-12

Outcom e measur e	Group s	Mea n Ran k	Sum of Rank s	Mean (SD)	Z-valu e	Asymp. Sig.(2-tailed)
MCS-	Group	11.6	128.5	56.13	-	.892
12 at	A	8	0	(10.4	.132	
Baselin				1)		
	Group	11.3	124.5			
e	B	2	0			
MCS-	Group	12.7	140.0	53.45	-	.373
12 at 3rd	A	3	0	(9.96)	.892	
week						
	Group	10.2	113.0			
	B	7	0			
MCS at	Group	14.3	158.0	50.45	-	.038
6th	A	6	0	(9.33)	2.07	
week					1	
	Group	8.64	95.00			
	B					

The above table shows mean ranking between interventional sessions of Group A and Group B. There was significant difference between groups, Group B showed more improvement in mental component summary-12 scale scores as compared to Group A. At baseline the p-value of MCS-12 was .892 which is more than α=0.05, that was non-significant. After six weeks on intervention, the resulted p-value was (.038) that was significant as compared to α=0.05. The statistical analysis showed there was significant difference exist between the groups, after six weeks of interventional period.

5.6.3 Mann Whitney test for Physical Component Summary-12

Outcome measure	Groups	Mean Rank	Sum of Ranks	Mean (SD)	Z-value	Asymp. Sig.(2-tailed)
PCS-12	Group	9.09	100.0	38.31	-	.078
at	A		0	(9.34)	1.76	
Baseline					2	
	Group	13.9	153.0			
	B	1	0			
PCS-12	Group	6.91	76.00	46.13	-	.001
at 3rd.	A			(11.9	3.32	
week				0)	9	
	Group	16.0	177.0			
	B	9	0			
PCS at	Group	6.00	66.00	53.86	-	.000
6th	A			(17.4	3.99	
week				9)	6	
	Group	17.0	187.0			
	B	0	0			

The above table shows mean ranking between interventional sessions of Group A and Group B. There was significant difference between groups, Group B showed more improvement in physical component summary-12 scale scores as compared to Group A. At baseline the p-value of PCS-12 was .078 which is more than α=0.05, that was non-significant. After six week on intervention, the resulted p-value was (.000) that was significant as compared to α=0.05. The statistical analysis showed there was significant difference exist between the groups, after six weeks of interventional period.

Cluster Bar Chart showing scores of Numeric Pain Rating Scale:

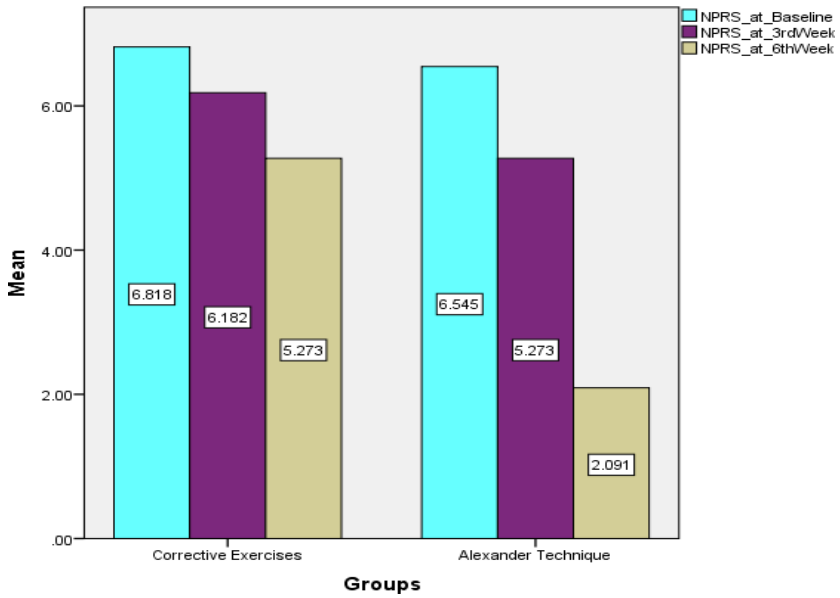


Figure 5.4: Cluster bar chart comparison between results of NPRS

The above cluster bar chart shows clearly represents difference between NPRS scores in both groups at baseline, at third week, and final reading at sixth week. The X-axis represents interventional groups and Y-axis represents mean of NPRS scores. After six weeks of intervention, the Group B (Alexander Technique Group) showed more significant results.

Cluster Bar Chart showing scores of Mental Component Summary-12:

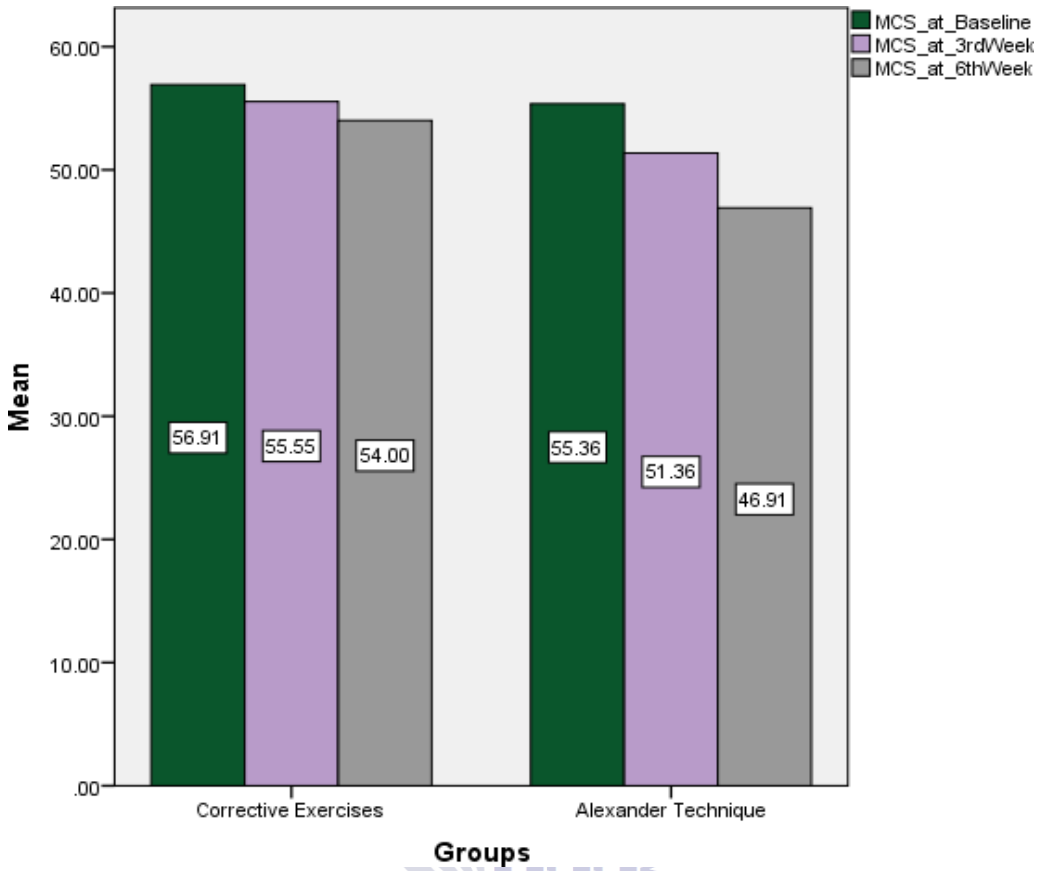


Figure 5.5: Cluster bar chart comparison between results of MCS-12

The above cluster bar chart shows clearly represents difference between MCS-12 scores in both groups at baseline, at third week, and final reading at sixth week. The X-axis represents interventional groups and Y-axis represents mean of MCS-12 scores. After six weeks of intervention, the Group B (Alexander Technique Group) showed more significant results.

Cluster Bar Chart showing scores of Physical Component Summary-12:

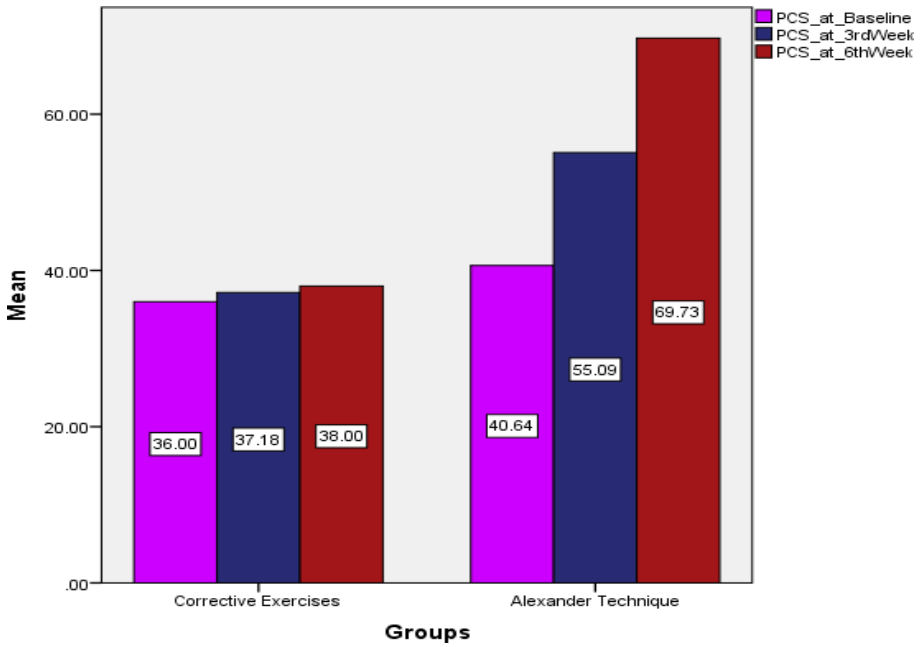


Figure 5.6: Cluster bar chart comparison between results of PCS-12

The above cluster bar chart shows clearly represents difference between PCS-12 scores in both groups at baseline, at third week, and final reading at sixth week. The X-axis represents interventional groups and Y-axis represents mean of PCS-12 scores. After six weeks of intervention, the Group B (Alexander Technique Group) showed more significant results.

DISUSSION

Many students suffer from Upper Cross Syndrome (UCS), so non-invasive methods to reduce suffering and improve quality of life have been studied. Musculoskeletal imbalances and UCS-related discomfort can be reduced by muscle-correction exercises. [27] By re-educating habitual movement patterns and reducing unnecessary muscular tension, the Alexander Technique has improved mental and physical quality of life for UCS patients. In 2024, Babaei and colleagues found. Comparisons between the two modalities are crucial because they have different theoretical frameworks and practical benefits. The Alexander Technique promotes aware and efficient general movement, while corrective exercises rebalance specific muscles. Shadi, Hanif, and Babaei et al. argue that by comparing and contrasting these interventions, particularly among students, researchers can make evidence-based UCS management recommendations to reduce pain and improve quality of life. [28]

The Friedman test results for the Numeric Pain Rating Scale (NPRS) showed that Group A's pain decreased statistically over the six-week intervention period, with a p-value of 0.003, significantly lower than the conventional alpha level of 0.05. [29] This remarkable decline suggests that subjects' pain perception changed significantly. The Friedman test, a strong non-parametric alternative to repeated measures ANOVA, makes the findings internally consistent regardless of normalcy. [30] The intervention likely had short- and long-term benefits across the study. The exceptional p-value strongly rejects the null hypothesis that pain scores do not change over time.

The SF-12 MCS's significant mental health improvement suggests that the intervention may have affected emotional resilience and cognitive coping strategies. [31] These qualities reduce the negative effects of stress and anxiety, which lower quality of life. Mental and physical re- education programs improve emotional stability, which changes participants' mental health views. [32] Most

MCS score changes can be explained by this psychological-rehabilitative interaction.

The Friedman test showed a statistically significant improvement in physical health over the six-week intervention period on the Physical Component Summary-12 (PCS-12) scale. A p-value of 0.002 suggests that the intervention has a significant and clinically relevant effect on the physical components of health-related quality of life since the observed changes are unlikely to have occurred by chance. These findings indicate that individualised physical therapies may improve functional capacity, pain and physical performance in the studied population. PCS-12 scores consistently rise over time, supporting the study's internal validity. This means the intervention has significant and long-term benefits.

Group B's baseline to sixth-week pain data showed a significant decrease. Friedman test provides strong statistical proof of improvement with a p-value of 0.000, well below 0.05. This crucial finding shows that this group's intervention reduced self-reported pain over time. NPRS improvement was statistically significant and may have reduced clinically relevant pain. Several similar clinical studies support this significant statistical improvement. [30]

The Friedman test for the Mental Component Summary-12 (MCS-12) scale showed statistically significant improvements in mental health outcomes over the six-week study period in Group B. McCall and Hadjistavropoulos (2024) claim that the intervention effectively addresses the study population's mental health issues, as MCS-12 scores increased from baseline to the sixth week. [33] Though it lowers quality of life, therapy may reduce anxiety, sadness, and stress. These mental health advances are important because better mental health improves daily functioning and stress resistance. The significant p-value suggests strong internal validity, suggesting the intervention caused the observed changes. Cognitive behavioural and mindfulness-based therapies also significantly improve MCS scores. [34]

The intervention increased functional mobility, physical endurance, and muscular strength, which contributed to the extraordinary PCS-12 score change. These changes directly impact ADLs and physical independence, making them significant. Krebs et al. (2024) found similar links between physical component summary scores, body composition, and quality of life. In this case, a non- parametric approach like the Friedman test is essential because it ensures the reliability of observed changes by collecting data from repeated measures without assuming a normal distribution. [35]

The inter-group study comparing Group A and Group B interventional session mean rankings showed a statistically significant difference in NPRS scores. The p-value of 0.511 ($p > 0.05$) suggests that both groups started with similar pain. Comparing baseline results ensures that later changes can be attributed to therapies rather than natural variations. Group B showed a significantly higher reduction in pain levels than Group A after six eeks oftherapy (p-value<0.05).

The intervention period average Mental Component Summary-12 (MCS-12) scores differ significantly between Group A and Group B. The two groups had similar mental health at baseline ($p = 0.892$), suggesting they were both healthy. Group B showed more mental health improvement on the MCS-12 scale after six weeks of treatment, as the p-value dropped to 0.038 (p 0.05). This suggests that Group B's intervention improved emotional health, stress resistance, and psychological functioning.

The first evaluation showed that the two groups had similar MCS-12 scores, indicating similar pre-intervention mental health profiles. A baseline p-value of 0.892 showed no statistically significant difference between groups, ensuring a fair assessment of the intervention's efficacy. Consistent baseline measurements are essential to determine the interventional sessions' effect. Confounding factors and prejudice will disappear. Since baseline MCS-12 scores were consistent, the intervention's effects were easier to understand. Bhamani et al. (2024) say

methodological rigour clarifies later changes. [36]

The groups' mental health results changed significantly after six weeks of planned intervention. Group B performed significantly better than the acceptable level (\u03b1 = 0.05) with a p-value of 0.038. Intervention improves B group psychological health, as shown by this data change. Group A did not progress as much, suggesting Group B gained more from the intervention.

7.1 CONCLUSION

Based on the results of this research, it was determined that Corrective Exercises and Alexander Technique are both useful in reducing pain and improving quality of life in students who suffer from Upper Cross Syndrome. Alexander Technique, on the other hand, in comparison with corrective exercises, demonstrated significantly more significant outcomes. The incorporation of Alexander Technique as a potential therapy option for upper cross syndrome is supported by these findings.

7.2 LIMITATION

- The study did not provide detailed information about the characteristics of the participants, such as definite cause, or severity of Upper cross syndrome. The presence of heterogeneity within the participant group may have influenced the outcomes and limited the ability to draw definitive conclusions.
- This might have limited the evidence by not including article written in other languages that may have been eligible for conclusion.
- Limited clinical area for study is involved.

7.3 RECOMENDATIONS

- Further studies on other technique in combination with Alexander Technique needed to find the effects on upper cross syndrome.
- In future, research should be conducted to explore the effects of Alexander Technique in rehabilitation of other musculoskeletal conditions.
- Further research can be done by using other outcome measures.
- Further studies should carry out to assess Upper cross syndrome by different screening tools and instruments.

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ANNEXURE

9.1 ENGLISH CONSENT FORM

The study you are about to participate is a Randomized Clinical Trial survey titled as;

"Effects of Alexander's techniques and Corrective Exercises on Upper Cross Syndrome"

The study will have no potential harm to participants. All data collected from you will be coded in order to protect your identity, and should not be disclosed to anyone. Following the study there will be no way to connect your name with your data. Your answers to the questions will not affect the quality of education given to you. Any additional information about the study results will be provided to you at its conclusion, upon your request.

You will be free to withdraw from the study at any time. If you agreed to participate, indicating that you have read and understood the nature of the study, and that all your inquiries concerning the activities have been answered to your satisfaction.

NAME ..... SIGNATURE .....

DATE .....

URDU CONSENT FORM

تصدیق کرتا / کرتی ہوں کہمحترم نے اپنی تحقیق

(طلباء میں اپر کراس سنڈروم پر اصلاحی مشقوں اور الیگزینڈر تکنیک کی تاثیر کا موازنہ کرنا)

زیرنگرانی ڈاکٹر
کے متعلق بتا دیا ہے۔ مجھے اس تحقیق کی نوعیت، مقاصد، احداف، توقعات، فوائد اور خطرات کے متعلق ساری معلومات فراہم کر دی گئی ہیں۔
اس تحقیق کے دوران ساری معلومات صیغہ راز میں رہیں گی اور مریض کا نام اور دیگر معلومات صرف تحقیق کے لیے استعمال ہوں گی۔ مجھے یہ بھی بتا دیا گیا ہے کہ میں اس تحقیق سے متعلقہ ہر قسم کے سوال پوچھنے کا مجاز ہوں اور یہ تحقیق صرف ایک شخص کے مفاد میں نہیں ہے بلکہ بحیثیت مجموعی انسانیت کا مفاد اس سے وابسطہ ہے۔ تمام تفصیلات جاننے کے بعد میں تحقیق میں شامل ہونے یا نہ ہونے پر کسی کا قائل نہیں ہوں۔ اس تحقیق سے کسی بھی وقت علیحدہ ہونے پر مجھ پر کوئی پابندی نہیں ہو گی۔ میں بذات خود بقائمی خوش و حواس اور رضا مندی سے اس تحقیقاتی عمل میں شامل ہوتی/ ہوتا ہوں۔

دستخط محققدستخطشرکتکار

تاریخ

9.2 PERFORMA

Serial Number_____ Age_____

Gender_____

OUTCOME VARIABLES:

- Pain
- Quality of life

TREATMENT GROUPS:

Group (A): Experimental Group (Was Received Corrective Exercises)
Group (B): Experimental Group (Was Received Alexander Technique)

Outcome Variables	Baseline	3rd Week	6th Week
Pain (NPRS Scale)			
Quality of life (Scale)			

9.3 QOL QUESTIONNAIRE

SF-12 Health Survey

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. **Answer each question by choosing just one answer**. If you are unsure how to answer a question, please give the best answer you can.

1. **In general, would you say your health is**:

☐1 Excellent ☐2 Very good ☐3 Good ☐4 Fair ☐5 Poor

The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	YES, limited a lot	YES, limited a little	NO, not limited at all
2. **Moderate activities** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	☐1	☐2	☐3
3. Climbing **several** flights of stairs.	☐1	☐2	☐3

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	NO
4. **Accomplished less** than you would like.	☐1	☐2
5. Were limited in the **kind** of work or other activities.	☐1	☐2

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	NO
6. **Accomplished less** than you would like.	☐1	☐2
7. Did work or activities **less carefully than usual**.	☐1	☐2

8. **During the past 4 weeks, how much did pain interfere with your normal work (including work outside the home and housework)?**

☐1 Not at all ☐2 A little bit ☐3 Moderately ☐4 Quite a bit ☐5 Extremely

These questions are about how you have been feeling during the past 4 weeks.
For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks…

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
9. Have you felt calm & peaceful?	☐1	☐2	☐3	☐4	☐5	☐6
10. Did you have a lot of energy?	☐1	☐2	☐3	☐4	☐5	☐6
11. Have you felt down-hearted and blue?	☐1	☐2	☐3	☐4	☐5	☐6

12. **During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

☐1 All of the time ☐2 Most of the time ☐3 Some of the time ☐4 A little of the time ☐5 None of the time

Patient name: Date: PCS: MCS:

Visit type (circle one)
Preop 6 week 3 month 6 month 12 month 24 month Other:_____

9.4 Numeric Pain Rating Scale

Numeric Pain Rating Scale is used to assess pain. It consists of 11 points, having an overall score between 0 and 10, where

- 0 represent no pain
- 1 – 3 represent mild pain
- 4 – 6 represent moderate pain
- 7 – 10 represent the most severe pain.