



## Effectiveness of Feldenkrais exercise program in comparison with mc Kenzie exercise program on postural alignment and functional disability among students with upper crossed syndrome

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### Abstract

**Background:** The aim of the study is to explore the effectiveness of Feldenkrais exercise program in comparison with McKenzie exercise program on postural alignment and functional disability among students with upper crossed syndrome.

**Methods:** In this comparative study, 30 female college students with upper crossed syndrome were selected and divided into two equal groups including Feldenkrais exercise group and Mc Kenzie exercise group. These two groups performed exercises of four weeks and five times per week. Postural alignment and functional disability using Craniovertebral angle and Neck disability index was assessed before and after intervention

**Result:** Intergroup analysis was done using unpaired t-test which showed significant improvement in Group A subjects (Feldenkrais exercise program) for improving postural alignment ( $p < 0.05$ ) and decreasing functional disability ( $p < 0.05$ ) post treatment.

**Conclusion:** Statistical analysis shows Feldenkrais exercise program were superior to McKenzie exercise program. Thus the study concluded that Feldenkrais exercise program should be beneficial in the rehabilitative phase of upper crossed syndrome.

**Keywords:** upper crossed syndrome (UCS), Feldenkrais exercise program, McKenzie exercise program, craniovertebral angle (CVA), neck disability index (NDI)

### Introduction

Students spend many hours a day with browsing social media and swiping their lives away on their tablets and smartphones [1]. They also had poor studying posture like having the book in the lap with flexed back increases the risk of upper crossed syndrome abnormalities [2]. Iqra Mubeen et.al (2016) [3] found out 37.1% prevalence of upper crossed syndrome in the medical students of university of Lahore [3]. Females suffer more than males for neck torment [4]. Vladimir Janda MD (1923–2002) coined the term Upper crossed syndrome (UCS). Janda conceptualized muscle imbalance as an impaired relationship between muscles prone to tightness or shortness and muscles prone to inhibition (Janda 1964) [5].

Conventional therapy focused on stretching to the over facilitated muscles and strengthening to the inhibited muscle to counteract the muscles imbalance but didn't met the functional pathology. Here the Feldenkrais method was a form of sensory motor education which improves the way of brain's coordination with posture and movement. Although Mc Kenzie exercise was an effective intervention for solving musculoskeletal problems, there is no evidence in comparing the effectiveness of Feldenkrais exercise program and Mc Kenzie exercise program among students with upper crossed syndrome.

### Methodology

This study is an Experimental design of comparative type. Thirty students were recruited from college of physiotherapy, Sri Ramakrishna Multispecialty Hospital, Coimbatore according to those who fulfilled the inclusion and exclusion criteria through non-probability purposive

sampling. Such eligible students were selected in the study after obtaining informed consent and divided into two groups, Group A and Group B.

### Inclusion criteria

Female students age group between 19 to 25 years. Slouched sitting for more than four hours per day. Usage of handheld devices while reading, working, and travelling for  $> 3$  hours [7]. Having Craniovertebral angle between  $38.0 - 47.5$  degrees, Neck disability index score between 6 to 15 and who are willing to participate in the study.

### Exclusion Criteria

Any diagnosed systemic pathology like malignancy, infection and inflammatory disorder, neurological disease and congenital or structural deformity. If they are participated in other physical activity or sports and unwilling participants.

### Outcome measures Neck disability index

Patient self-assessed functional outcome measurement tool with 10 items Each question is scored on a 0 to 5 rating scale, in which 0 means 'No pain' and 5 means 'Worst imaginable pain' with maximum score of 50 [8].

### Craniovertebral angle

The CV angle is the most reliable and valid indicator of FHP [9, 10]. An angle less than  $50^\circ - 53^\circ$  may indicate FHP [11]. Thereby, the smaller the CV angle, the greater the disability [12]. ON PROTRACTOR smart phone application is used to measure.

**Treatment intervention**

**Group A:** Feldenkrais exercise program for 30 minutes a day for 4 weeks.

**Group B:** Mc Kenzie exercise program for 30 minutes a day for 4 weeks. Treatment program, lasting for 20 sessions (5 session / week).

**Feldenkrais exercise program**

The Feldenkrais Method is the way of learning – learning to move more freely and easily, to carry less stress in your body, to stop doing the things that cause pain. The awareness through movement method of exercise program was taught.

Relax your shoulders and neck through lift and lower down each shoulder at a moment.

Roll the neck. Press your ear to your shoulder as far as you can and bring it around to front, lowering the chin towards chest.

Do ear to the shoulder exercise. Lower your ear to the shoulder and bring the head back to the normal, center position.

Do shoulder to the ear exercise. Lift the shoulder to the ear and then return it to the center. Repeat each exercise on the above for 1 minute and switch to the other sides.

Sitting on the forward edge of a chair with a flat seat, slowly rotate your upper body to the right slightly. Then return slowly. Repeat for 6–10 times. Note exactly how far you can see easily.

Focus your eyes on an object or spot straight ahead of you. While your eyes continue to look, slowly turn your head and upper body to the right. Then slowly return. Repeat for 6–10 times.

Rotate the upper trunk to the right for 2–4 times. Check for any improvement. Now do the movement again, but keep

both your head and eyes facing forward for 6–10 times. As you turn, notice shoulder movement.

Relax your neck and shoulder and keep your feet flat on floor, simply move your left knee forward for 6–10 times and other side.

Move your left knee forward while turning your head, eyes, and upper body to the right a little bit. Repeat this movement very slowly 6–10 times. Do you feel any improvement?

**Mc kenzie exercise program**

The McKenzie exercise encourages self-care treatment through perennial exercises and focuses on extension, as well as vary of motion exercise, manipulation, and patient education.

Prone scapular stabilization

Deep neck flexor (chin tucks)

Shoulders shrug Mc Kenzie exercises for neck

Cervical protrusion and retraction

Repeated shoulder horizontal adduction

Repeated shoulder flexion

Repeated shoulder extension

Neck flexion McKenzie exercises

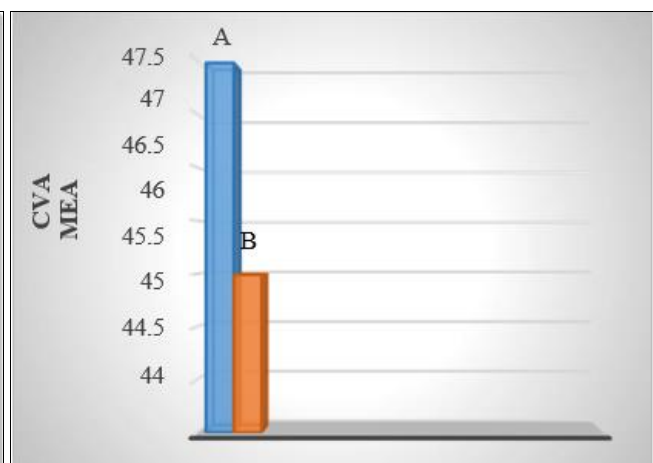
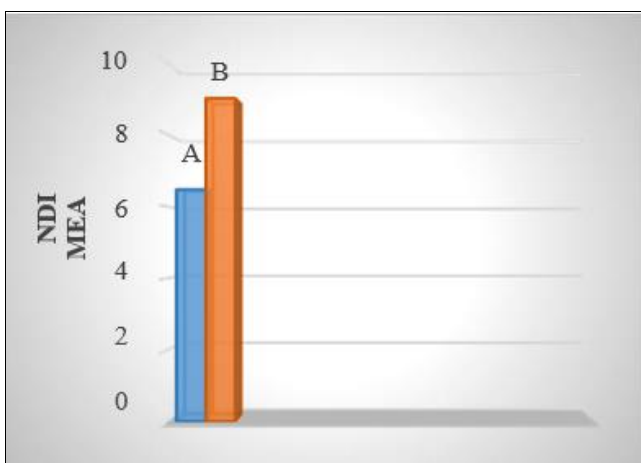
The exercises are to be done with 15 repetitions, 15 second hold time.

**Data analysis**

Pre and post-test values of the group were obtained on the first day of treatment and at the end of four weeks. Data collected were statistically analyzed. Paired ‘t’ test and unpaired ‘t’ test was used to find out the statistical differences. The ‘p’ value was set at < 0.05. Formulas for paired ‘t’ test and unpaired ‘t’ test were used.

**Table1:** post-test mean values of neck disability index and craniovertebral for group-A and group-B

Measurement Tool	Post-test Mean A	Post-test Mean B	Mean Difference	Standard Deviation	Calculated t value	Table –t value	Level of Significance
NDI	6.47	9	2.53	2.56	2.56	2.048	p<0.05
CVA	47.48	45.49	1.99	2.16	2.52	2.048	p<0.05



**Graph:** post - test mean values of neck disability index and craniovertebral angle for group A and group B

**Results**

Paired t-test was used to compare the values of Craniovertebral angle and Neck disability index values before and after treatment in Group A and Group B. Unpaired t-test was used to compare the post- test values of

Craniovertebral angle and Neck disability index values between Group A and Group B. Data collected through this study showed improvement in forward head posture and neck function in patient with upper cross syndrome when approached through Feldenkrais method and Mc Kenzie

method. In independent 't' test, mean score of Group A for Neck disability index was 6.47 and for Group B was 9. Mean score of Group A and Group B had difference in their value. It shows functional disability decreased in Group A. SD and 't' values were 2.56 and 2.68 where p value was less than

0.05. Mean score of Group A for Craniovertebral angle was 7.48 and Group B was 45.49. Mean score of Group A and Group B had difference in their value. It shows postural alignment improved in Group

A. SD and 't' values were 2.16 and 2.52 respectively. p value was less than 0.05. In dependent 't' test, post mean score of Group A and Group B for Neck disability index was 6.47 and 9. Mean score of Group A and Group B had difference in their value. It shows functional disability decreased in Group A. SD and 't' values for Group A is 0.91 and 15.3 respectively. SD and 't' values for Group B were 0.94 and 9.06 respectively. p value was less than 0.05. Post mean score of Group A and Group B for Craniovertebral angle was 47.48 and 45.49. Mean score of Group A and Group B had difference in their value. It shows postural alignment improved in Group A. SD and 't' values for Group A was

0.88 and 16.01 respectively. SD and 't' values for Group B were 0.79 and 9.99 respectively. p value was less than 0.05.

### Discussion

From biomechanical dimension, sitting position of student is a prolonged trunk forward bending and forward head posture during lecture and leisure activities. It can be assumed that students have a high risk of neck or shoulder pain and upper thoracic pain which may lead to UCS [15]. Levine et.al stated that a Feldenkrais practitioner directs attention to habitual movement patterns that are thought to be inefficient or strained, and attempts to teach new patterns using gentle, slow, repeated movements [16] and Knaster et.al suggest that slow repetition is believed to be necessary to impart a new habit and allow it to begin to feel normal [17]. Youn and sung noted that head and shoulder posture significantly improved after performing the Mc Kenzie exercise in patients with chronic neck pain [18]. Moreover, while the Mc Kenzie exercise has been demonstrated to be effective in decreasing pain and improving posture. In this study, McKenzie exercises produces local effect on the muscles involved in upper cross syndrome while the Feldenkrais exercise program improves the sensory motor connection and coordination comprehensively thus improving the posture through its awareness. In line with my study, Seidi et.al studied the efficiency of corrective exercise interventions on thoracic hyper-kyphosis angle and concluded that comprehensive exercises had a greater effect on kyphosis curvature than local exercises [19]. and Mansoureh et.al conclude that comprehensive corrective exercises more effective than local corrective exercises by conducting a study for female students with upper cross syndrome [20].

### Conclusion

Feldenkrais and McKenzie exercise program were found to be clinically effective. However statistical analysis shows Feldenkrais exercise program were superior to McKenzie exercise program. Thus, the study concluded that Feldenkrais exercise program should be beneficial in the rehabilitative phase of upper crossed syndrome.

### Limitations

Short term follow-up period. Study was confined only to students with symptomatic upper crossed syndrome. Study included only female students.

### Recommendations

Long term follow up can be included. Studies can include both genders. Comparing the effects on symptomatic and asymptomatic upper crossed syndrome can be done. Study can be implemented in different populations.

### References

- Ahmadi H, Yalfani A, Gandomi F. Effect of eight weeks of corrective exercises carried out in water on static and semi dynamic balance on students with upper crossed syndrome (Janda approach). *J Rehab Med*,2020;9(3):286-296.
- Mansoureh Mogharrabi-Manzari PhD, Gholamali Ghasemi PhD, Hossein Negahban PhD. The Effect of Eight-Week Shoulder Girdle, Pelvic Girdle and Combined Corrective Exercises on Maximal Voluntary Ventilation in Female Students with Upper Crossed Syndrome: A Randomized Clinical Trial. *JRSR*,2021;8:51-56.
- Iqra Mubeen, Salman Malik, Waseem Akhtar, Muneeb Iqbal, Muhammad Asif, Adil Arshad, *et al.* prevalence of upper cross syndrome among the medical students of university of lahore. *int j Physiotherapy*,2016;3(3):381-384.
- Croft PR, Lewis M, Papageorgiou AC, Thomas E, Jayson MI, Macfarlane GJ *et al.* Risk factors for neck pain: a longitudinal study in the general population. *Pain*,2001;93(3):317-325.
- Muscle imbalance syndromes". Assessment and Treatment of Muscle Imbalance: The Janda Approach, 2018.
- Mohammed Challab, Idan Almasoodi, Reza Mahdavinejad, Ghollamali Ghasmi. The Effect Of 8 Weeks National Academy of Sports Medicine Exercises Training on Posture, Shoulder Pain, And Functional Disability in Male with Upper Cross Syndrome. *psychology and education*,2021;58(2):6741-6752.
- Aniqa Khaliq, Shamaaila Yaqub, Farooq Islam, Asim Raza, Aiman Batool, Sana Jamil. Risk factors associated with upper crossed syndrome in females of age 25-50 years: a population- based case control study. *Khyber Med Univ J*,2021;13(4):201-5.
- James Dunning. The Psychometric Properties of the Neck Disability Index: A Comprehensive Review, 2014.
- Jiyoung Kim, PT1, Sungjoong Kim, PhD, PT2, Jemyung Shim, PhD, PT, Hyebin Kim, PT, Seoungjun Moon, PT, Nahyeon Lee, PT, Mingyeong Lee, PT, Eunju Jin, PT, Eunji Choi, PT. Effects of McKenzie exercise, Kinesio taping, and myofascial release on the forward head posture. *The Journal of Physical Therapy Science. J. Phys. Ther. Sci*,2018;30:1103-1107.
- Joy C Macdermid, PhD et.al. Measurement Properties of the Neck Disability Index: A Systematic Review. *Journal of Orthopedic & Sports Physical Therapy®* on, 2022, 22.
- Tomas Gallego-Izquierdo, Enrique Arroba-Díaz, Gema García-Ascoz, María del Alba Val- Cano, Daniel Pecos-Martin and Roberto Cano-de-la-Cuerda.

- Psychometric Proprieties of a Mobile Application to Measure the Craniovertebral Angle a Validation and Reliability Study, 2020.
12. Eun-Kyung Kim PT, PhD Jin Seop Kim PT. PhD. Correlation between rounded shoulder posture, neck disability indices, and degree of forward head posture. Correlation between rounded shoulder posture, neck disability indices, and degree of forward head posture. *J. Phys. Ther. Sci*,2016;28:2929-2932.
  13. Riddhi Dinesh Pasad, Dr. Abhijit N. Satralkar Effectiveness of Feldenkrais exercise o chronic neck pain, forward head posture and cervical spine range of motion in young patients with upper cross syndrome at the end of 3 weeks - An experimental study. *International Journal of Applied Research*,2020;6(9):384-397.
  14. Vaishnavi. *et al.* A study to analyse the effect of McKenzie's method of exercise to treat upper cross syndrome associated with cervicogenic headache. *Biomedicine*,2021;41(4):855-858.
  15. Daneshjoo A, Mousavi Sadati SK, Pourahmad F. Effect of Corrective Exercise vs Corrective Games on Upper Crossed Syndrome in Female Students. *Physical Treatments*,2021;11(1):13-24.
  16. Levine. Andrew *The Bodywork and Massage Sourcebook*. Lowell House, 1998, 249-60. ISBN 9780737300987.
  17. Knaster Mirka. *Discovering the Body's Wisdom: A Comprehensive Guide to More Than Fifty Mind-Body Practices*. Bantam. Pp, 1996, 232-8. ISBN 9780307575500.
  18. Youn JH, Sung DJ. The influence of McKenzie Approach on head, shoulder posture of the patients with chronic neck pain. *The Research Institute of Physical Education & Sports Sci*,1998;17:79-90.
  19. Seidi F, Rajabi R, Ebrahimi R, Alizadeh MH, Miniinejad H. The efficiency of corrective exercise interventions on thoracic hyper-kyphosis angle. *Journal of Back and Musculo- skeletal Rehabilitation*,2014;27(1):7-16.
  20. Mansoureh Mogharrabi-Manzari, PhD Gholamali Ghasemi1, PhD Hossein Negahban. PhD. The Effect of Eight-Week Shoulder Girdle, Pelvic Girdle and Combined Corrective Exercises on Maximal Voluntary Ventilation in Female Students with Upper Crossed Syndrome: A Randomized Clinical Trial. *JRSR*,2021;8:51-56.