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Research article

Screening for lower cross syndrome in asymptomatic individuals

Priyanka Sahu, Pratik Phansopkar*

Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India

ABSTRACT

Lower cross syndrome results from muscle strength imbalance in the lower segment. It also involves tightness of the iliopsoas, rectus femoris, fascia lata tensor, adductor group, gastrocnemius, and soleus. Pressure biofeedback device is used for the purpose of measuring and treating the transverse abdominis muscle. This study is needed because over time due to prolonged daily activities and lack of regular exercises in young people, this leads to muscle imbalance which leads to low back pain in this population. The goal of the study is to screen for lower cross syndrome in asymptomatic individual**.** To screen for lower cross syndrome in asymptomatic individual. Based on the inclusion and exclusion criteria, 300 persons will be included in the study, and the suitable evaluation method for lower cross syndrome will be used. Females had increased muscle tension and weakness, according to the findings. The iliopsoas muscle, in particular. The length of the spinal extensor muscle, the strength of the transverse abdominus, and the strength of the gluteus maximus muscle are all notable differences. Lower cross syndrome can also cause some postural problems in young people**.** Females were shown to be more likely than males to acquire lower cross syndrome in this study. According to this study, young people are more likely to acquire lower cross syndrome as a result of bad posture, prolonged sitting, and a variety of other variables. Females are more likely than males to acquire lower cross syndrome, according to this study.

Keywords: lower cross syndrome, Reedco Posture scale, manual muscle testing, Thomas test.

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Correspondence: Pratik Phansopkar* ✉ drpratik77@gmail.com

Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India

INTRODUCTION

Lower Crossed Syndrome (LCS) is a musculoskeletal condition characterised by different patterns of muscular weakness (abdominals and gluteus maximus) and tightness (iliopsoas and spinal extensors) that connect the dorsal and ventral sides of the body. Low back discomfort will result from this postural discrepancy in the future. As a result, the goal of this study is to find a way to test young people for lower crossed syndrome. Lower cross syndrome, also known as pelvic cross syndrome or underkruz syndrome [1], is characterized by a muscular imbalance between the deep abdominal muscles and the gluteus medius and maximus. This is a postural-distortion syndrome that affects the lower kinetic chain. Lower-crossed syndrome is characterized by anterior pelvic turn, increased lumbar lordosis (swayback), and weak abdominal muscles. The majority of these individuals have severe low back pain, piriformis syndrome, and anterior knee discomfort. The oblique rectus abdominis, gluteus maximus, medium gluteus, and hamstring are all involved in the lower cross syndrome [2].

The iliopsoas, rectus femoris, tensor fascia lata, adductor group, gastrocnemius, and soleus muscles are also involved. It causes anterior pelvic movement, hyper lordosis of the lumbar spine, flexion hips, and hyperextended knees. Low-cross syndrome can arise as a result of a variety of situations, including chronic, recurrent running acts. Inaction can have a negative impact on the body's mechanics, such as immobilization, disuse, or chronic postural pain, as may long periods of sitting and poor posture at the workplace. Lower cross syndrome can be classified into two types: lower back and hip. When one muscle is shortened or tightened, the opposite muscle relaxes, according to the Sherrington law of reciprocal inhibition. As a result of the stretching of compressed muscles and muscle strength, the pelvis, hip joint, and lumbar spine relax. As muscles adapt to protect the body from damage or discomfort, some are hyperactive, while others are repressed [3].As a result, joint stress changes and muscle fatigue rises. These defensive reflexes are more easily triggered when postural or anti-gravity muscles are engaged. When physical stress occurs, however, muscles with a largely dynamic or physical function appear to be impaired. Normal movement patterns are altered when muscles adapt to prevent or lessen physical damage. The performance of released motion is influenced by muscle strength. Muscle imbalance

can also lead to changes in joint mechanics, which can lead to an uneven distribution of articular pressure and a shift in rotational centres, both of which can lead to joint instability and pain. Alterations in movement patterns are caused by a combination of strong and weak muscles, which leads to alterations in joint biomechanics and consequent degenerative changes. Secondary joint hypermobility disorders might develop as a result of a limited range of joint motion caused by prolonged muscle tightness [4].

If the lordosis is shallow and reaches into the thoracic area, Imbalance is predominantly in the pelvic muscles; The imbalance is predominantly in the trunk muscles, if lordosis is deep and large. According to Janda, muscle imbalance is an issue with the interplay between muscles prone to tension, shortness and inhibition. According to the source, our bodies have two sorts of muscles: postural muscles like the iliopsoas, lumborum quadrates, erector spinae, and back rotators, and phasic muscles like the gluteus maximus. Static or postural muscles, he observed, tend to stiffen more than others. Individuals in the age group of late Adolescent to 40-year- old are very active in routine and therefore are exposed to more pressure.

In comparison to older adults, these individuals' age-related changes are minor. The mismatch between phasic and postural muscles fundamentally creates strain, changed movement patterns and tension changed movement patterns, resulting in re-injury of these critical structures, according to one of the most intriguing notions in physical medicine [5].

The hip flexors shorten or tighten as a result of sitting for extended period on computer, according to Janda. As a result, the brain will begin to suppress or turn off the opposing gluteus muscles. Seeing that hip flexion contracture and forward pelvic rotation, the imbalance pattern now allows for higher lumbar lordosis and hip flexor overactivity to compensate for the weak abdominals [6]. Tightened psoas would limit hip extension and poor hip extension occurs due to an inhibited antagonistic gluteus maximus, this occurs due to ipsilateral hamstrings and contralateral lumbar erector spinae become tightened to perform the required extension of hip instead of gluteus maximus muscle [7].

Lower crossover syndrome is a dangerous combination of lower back structures with biomechanical muscle dysfunction caused by severe stress. Lower back discomfort is common in people with such postural imbalances, and if left untreated, this postural imbalance can lead to persistent lower back discomfort that is more difficult to rectify later on [8].

Females had a higher prevalence of lower crossing syndrome than boys in the same age group, according to the studies. It was also revealed that the iliopsoas (left sided) tightness of boys and girls of the same age group is not significantly different. There is a significant difference in spinal extensor length, abdominal strength, maximum strength of bilateral gluteus, and right iliopsoas length between boys and females of the same age group, and girls are more likely to experience weakening of these muscles. However, the prevalence was not significant in this study when compared to the number of people that were screened. The objective of the study was to screen for lower cross syndrome in asymptomatic individual and to prevent lower cross syndrome in the young individuals.

METHODOLOGY

After receiving ethical authorization from the Institutional Ethics Committee of Datta Meghe Institute of Medical Sciences, Deemed to be University, this research is being done in local communities in Wardha City, Maharashtra, India. 300 people will be included in the study based on the inclusion and exclusion criteria, and the evaluation procedure will be followed. The inclusion criteria included asymptomatic individual and the patients willing to participate. The exclusion criteria included chronic low back pain, disc herniation, neurological deficits, respiratory conditions, and patients who are not willing to participate or uncooperative.

Procedure

Participants were screened for inclusion and exclusion criteria based on their willingness to participate in the study. Screening of participants. Participants who were able to satisfy the inclusion criteria were included in the study. Patient with low back pain and other degenerative disease were not included in the study. Total 300 individuals were included in the study, each and every person participated actively. Demographic data include Name, Age, Gender, Height, Weight and Occupation were collected from 300 individuals and was filled by physiotherapist. All of the volunteers warmed up with back stretches under the direction of the therapist before to the measurement of muscle length and strength. 10 reps of side flexion and rotation, followed by a 5-minute walk around the study site at your own speed.

The REEDCO posture scale is used to do the initial postural examination. The length of the bilateral Iliopsoas muscle was measured using a Universal Goniometer and the Modified Thomas test. A non-elastic measuring tape was used to examine the length of the spinal extensor muscle. Abdominal muscular strength and bilateral Gluteus maximus Manual muscle testing was graded according to the MRC grading system. A graduate physiother performed all of the measures.

Posture assessment is done by REEDCO POSTURE SCALE by standing behind the volunteer[9]. Ask the volunteer to stand in anatomical position.

The volunteer was told to lie supine with half of her thigh protruding from the sofa while the therapist stood by the side of the table. Excessive lumbar lordosis was evaluated in the lumbar spine. Lumbar spine should be flattened and pelvis should be stabilised, volunteers were asked to flex (pull) and keep the non-tested hip should

be in flexion, take the knee close to the chest. The length of the

iliopsoas on the opposite side should then be measured with a universal goniometer, with the fulcrum above the greater trochanter, the movable arm should be equivalent to the lateral boundary of the femoral shaft, and the stationary arm parallel to the testing table. The test was carried out on both sides. If the hip extension angle was less than 15 degrees, the iliopsoas was termed tight.

The subjects were instructed to stand tall with a 0° lateral flexion and rotation of their cervical, thoracic, and lumbar spines. The spinous processes of the C7 and S1 vertebrae were marked with a skin marking pencil, and the distance between them was measured using a tape measure. The therapist's (S.D) hand was then used to restrain the pelvis from tilting forward by keeping it on PSIS. The volunteers were instructed to bend forward progressively while maintaining a balanced load on both feet and keeping their arms relaxed. The movement was terminated when the volunteer encountered difficulty to additional flexion and the therapist noticed the pelvis begin to tip anteriorly. After that, the distance between the two spinous processes was measured again. The difference between the first and second measurements indicates the degree of thoracic and lumber flexion. It is considered normal when the muscle length is equal to 10 cm.

The volunteers were asked to lie in supine position with both hip and knee flexed and hands clasped behind their heads (for Grade-V), arms crossed over the chest (for Grade-IV), and arms completely extended over the plane of the body (for Grade-V) (For Grade-III). During the test, the therapist stood by the side of the table, at the level of the volunteer's chest, to check that the volunteer's scapular was clear of the table. After that, the volunteers were told to bend their trunks to their entire range of motion. The scapula cleared the table as the trunk curved up. Tuck your chin and lift your head, shoulders, and arms off the table like you're doing a sit-up, according to the instructions.

Volunteers were instructed to lie on their backs with their legs flexed to 90 degrees. On the tested side, the therapist (S.D.) was standing at the level of the pelvis. With one hand, the therapist applied downward pressure to the low back while the other stabilised the pelvis. The volunteers were told to stretch their hips while keeping their knees flexed at 90 degrees (blue arrow in fig). The therapist applied moderate pressure to the lower part of the posterior thigh in the direction of hip flexion (maximum resistance for Grade-V) so that the volunteer could fully extend his or her hip. MMT grading was used to grade the gluteus maximus strength.

RESULT

Table no-1 In the above TABLE iliopsoas muscle test was done for right and left side, the mean of right side found was 13.17 and that of left side found was 12.44. Right side standard deviation found was 1.18 and that of left side found was 1.27.in this table it was found that there was more left side weakness of iliopsoas muscle than right side. p value is 0.0001 S which is statistically significant.

Table 1. Demographic details

Demographic details	No. of patients	Mean +_SD
1. Age	300	23.211.48(21-27Yrs)
2. Gender	300	M(15.33%) F(84.67%)
3. Height	300	161+_5.94
4. Weight	300	46.39+_2.56

Table 2. Difference between pre-test and post-test

REEDCO Posture score	300	Normal-89(29.7%)
Iliopsoas score right	300	**13.17+_1.18** (p-value=0.0001)S
left	300	12.44+_1.27
Spinal extensor muscle	300	Normal – 53(17.7%) tight -147(83.3%)
Transverse abdominus		
Grade 4	124	41.3%
Grade 5	176	58.7%
Gluteus maximus		**4.59+_0.49** (p- value=0.32)NS
right		4.65+_0.98
Left	300	
	300	

Figure 1. Comparison of ILIOPSOAS score right and left side

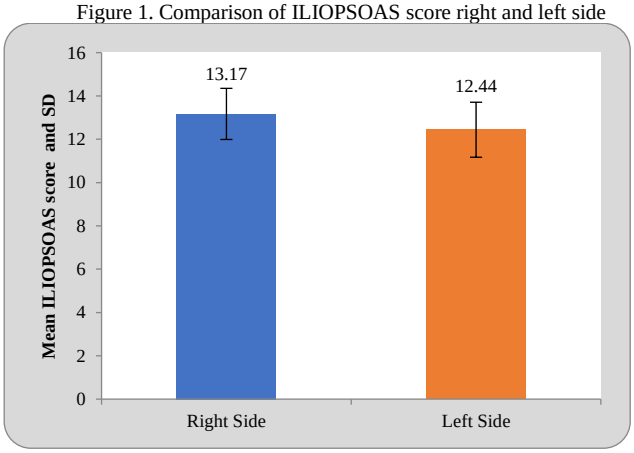

Figure 1-The iliopsoas muscle test was performed on both the right and left sides in the graph above, with the right side finding a mean of 13.17 and the left side finding a mean of 12.44. The right-side standard deviation was determined to be 1.18, whereas the left side standard deviation was found to be 1.27. The left side of the iliopsoas muscle was shown to be weaker than the right side in this table. The statistical significance of the p value is 0.0001 S.

Figure 2. Comparison of Gluteus Maximus score right and left side

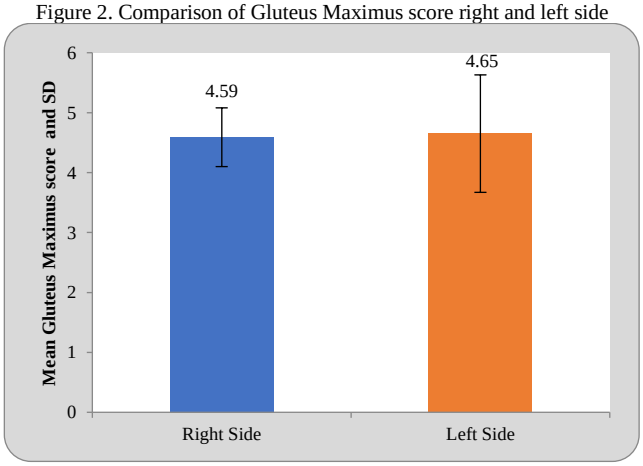

Figure 2. The value of p-0.32 in the graph above is statistically non-significant. The right side's gluteus maximus muscle mean was 4.59, while the left side's was 4.65, with a right side standard deviation of 0.49 and a left side standard deviation of 0.98. The right side's standard error mean was found to be 0.02 and the left side's to be 0.05. The mean difference is 0.05+1.00, with a t-value of 0.98.

The statistical analysis was carried out using descriptive and inferential statistics, as well as the z-test for difference between two means. The software used in the study was SPSS 27.0, and the threshold of significance was set at 0.05.

DISCUSSION

Muscular imbalance is one of the most common causes of low back discomfort in young people. pelvic crossed syndrome (LCS) is a muscle imbalance characterised by tight hip flexors, lower back muscles, and abdominals, as well as gluteus maximus muscle weakness, all of which affect the biomechanical force distribution in the lower back region, potentially contributing to chronic low back pain. Data on the prevalence of LCS in young persons of both genders is scarce. As a result, the goal of this research was to find out the prevalence of tight and weak structures in both males and females, as well as the occurrence of Lower crossed syndrome in young people [9][][10].

This study enlisted 300 healthy volunteers between the ages of 21 and 31. To see if there was any homogeneity across genders, the demographic data (age, gender, height, and weight) were analysed using the fisher t-test, which revealed statistically significant differences in height and weight but statistically negligible differences in age between both genders. When the data was analysed, it was discovered that females have a higher prevalence of abdominal weakness than males. A total of 124 of the 244 individuals had abdominal weakness, while 100 did not. Muscular length, irritation threshold, and altered recruitment are regarded to be three major elements in muscle tightness, according to Janda [11]. Tight muscles are often shorter and have a different length-tension relationship than normal muscles. Muscle tightness lowers the activation threshold, also known as the irritability threshold, implying that the muscle is more easily triggered by movement. Tight and facilitated muscles are usually recruited first in movement patterns because movement favours the path of least resistance. Tight muscles normally maintain their strength, but in extreme cases, they may become frail. When the data was analysed, a significant difference in gluteus maximus strength between men and women was identified, with a p value of 0.001, indicating that females have a higher frequency of hip extensor weakness than men. According to the findings of the study, females are more likely than males to suffer gluteus muscle weakness [10].

In the general population, muscle tightness is caused by an increase in tension caused by active or passive causes. Due to spasm or contraction, muscles can become shorter when they are active. A muscle, on the other hand, can be passively shortened as a result of postural adaptation or scarring. Tightness, regardless of the cause, restricts range of motion and can lead to muscular imbalance. Soft tissues such as muscles and ligaments are unable to keep up with the rate of bone growth during periods of rapid growth, resulting in muscular imbalances and a decrease in flexibility in the young population [11].

Kendall believes that abdominal muscular weakness and prolonged sitting position produce back extensor muscle tension. Back extensor muscle length and hip extensor muscle strength have a strong but weak relationship [1]). When muscles are dysfunctional, Janda discovered that they tend to be either tight or weak. Due to overload caused by poor posture and ergonomics, they are prone to tightness[15]. Tight muscles are occasionally discovered to be weak, whereas weak muscles are occasionally discovered to be tight. According to Janda's LCS model, hip flexors and spinal extensors muscles are prone to tightness due to their tonic character, whereas gluteus maximus and abdominal muscles are prone to muscle weakening due to their phasic character [13].

Exaggerated pelvic anterior tilt occurs when the hip flexors are too tight. The lumbar spine becomes overly arched, while the thoracic spine develops a kyphotic (rounded/hunchback) alignment, which can cause forward head posture [17]. Tight hip flexors can take over the function of the abdominal muscles, making some abdominal workouts nearly hard to benefit from. Because of their antagonist-agonist relationship, tight hip flexors cause the principal hip extensors to stretch and weaken [14].

Lower crossover syndrome increases the risk of mechanical low back pain and lower extremity injury in young people, particularly in the hip, knee, and ankle, as a result of aberrant motor activation of muscles due to muscle tightness and weakness. As a result, clinical detection and prevention of lower crossed syndrome in young people is critical for future pathology.

CONCLUSION

The given study was conducted to know the prevalence of individuals with no symptoms. It was found that Females had a higher prevalence of lower crossed syndrome than boys in the same age group, according to this study. The tightness of the iliopsoas (left sided) muscle in boys and girls of the same age group was likewise shown to be minor. However, between boys and females of the same age group, there is a substantial difference in spinal extensor length, abdominal strength, bilateral gluteus maximus strength, and right iliopsoas length, and females are more likely to develop weakening of these muscles.

REFERENCES

1. Das S, Sarkar B, Sharma R, Mondal M, Kumar P, Sahay P, 2020. "Prevalence of lower crossed syndrome in young adults: a cross sectional study". Int J Adv Res. 5(6), 2217.

2. Key J, 2010. "The Pelvic Crossed Syndromes: A reflection of imbalanced function in the myofascial envelope; a further exploration of Janda's work". J Bodyw Mov Ther. 14(3), 299–301.
3. Peeler J, Anderson JE, 2007. "Reliability of the Thomas test for assessing range of motion about the hip. Phys Ther Sport". 8(1), 14–21.
4. Jeon I, 2019. "Comparison of Test-retest Measurement Reliability of Iliopsoas Strength between Break and Make Test in Subjects with Lumbar Extension Syndrome". J Musculoskelet Sci Technol. 3(2), 54–8.
5. Ishida H, Hirose R, Watanabe S, 2012. "Comparison of changes in the contraction of the lateral abdominal muscles between the abdominal drawing-in maneuver and breathe held at the maximum expiratory level". Man Ther. 17(5), 427–31.
6. Clapis PA, Davis SM, Davis RO, 2008. "Reliability of inclinometer and goniometric measurements of hip extension flexibility using the modified Thomas test". Physiother Theory Pract. 24(2), 135–41.
7. Clark RA, Mentiplay BF, Hough E, Pua YH, 2019. "Three-dimensional cameras and skeleton pose tracking for physical function assessment: A review of uses, validity, current developments and Kinect alternatives". Gait Posture. 68, 193–200.
8. Nabavi N, Mohseni-Bandpei MA, Mosalla-nezhad Z, Rahgozar M, 2011. "Reliability of Measuring Lumbar Range of Motion Using Modified-Modified Schober Test in Healthy Subjects". Arch Rehabil. 12(3), 16–23.
9. Phansopkar P, Naqvi WM, 2020. "Early physiotherapy rehabilitation approach enhances recovery in rare acute tibial osteomyelitis post-operative in a 9 year old child". Medical Sciences. 5.
10. Hamid MSA, Ali MRM, Yusof A, 2013. "Interrater and Intrarater Reliability of the Active Knee Extension (AKE) Test among Healthy Adults". J Phys Ther Sci. 25(8), 957–61.
11. Cuthbert SC, Goodheart GJ, 2007. "On the reliability and validity of manual muscle testing: a literature review". Chiropr Osteopat. 15(1), 4Devrimsel G, Turkyilmaz AK, Yildirim M, Beyazal MS, 2015. "The effects of whirlpool bath and neuromuscular electrical stimulation on complex regional pain syndrome". J Phys Ther Sci. 27(1), 27–30.
12. Byeon SJ, Kim KH, 2017. "The effects of exercise using an ergometer with swaying saddle on chronic lower back pain". J Phys Ther Sci. 29(4), 729–32.
13. Zade R, Shende G, Sahu P, Fating T, Deshpande S, Phansopkar P, 2012. "Rehabilitation in Duchenne Muscular Dystrophy: A Case Report". J Pharm Res Int. 114–20.
14. Zade R, Shende G, Sahu P, Fating TB, Deshpande S, Phansopkar P, 2021. "Pre-Prosthetic Rehabilitation in Post-operative Transtibial Amputation Patient: A Case Report". J Pharm Res Int. 110–5.
15. Pathan Heena, Phansopkar Pratik, 2021. "Screening for Upper Cross Syndrome in Asymptomatic A Study Protocol". Indian Journal of Forensic Medicine & Toxicology. 15(1), 50-54.
16. Bawiskar D, Dhote S, Phansopkar P, 2020. "Early physical rehabilitation post-surgery in a complex type 5 Schatzker Tibial plateau fracture improves functional outcomes: A case report". Medical Sciences. 8.

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