

## ORIGINAL ARTICLE

# Occurrence of Lower Cross Syndrome among College Students: An Observational Study

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## ABSTRACT

**Objective:** Lower cross syndrome is a musculoskeletal imbalance characterized by specific patterns of muscle weakness i.e. abdominals and gluteal and tightness of hip flexors and thoracolumbar extensors that crosses between dorsal and ventral side of the body. This postural imbalance among young individuals can lead to low back pain in future. Hence, this study's aim is to find out prevalence of lower cross syndrome in college going students between age group of 18-23 yrs.

**Methods:** A total of 100 students between age group 18-23 yrs were taken with consent form. Each student underwent for assessment of strength of abdominal and gluteal muscle with the use of Manual Muscle Testing and measurement of hip flexors tightness and deformity with Harris Hip Functional Scale.

**Conclusion:** Only 14% of the total subjects were found to be prevalent for lower cross syndrome. so, there is very low prevalence of lower cross syndrome.

## KEYWORDS

• Lower cross syndrome • Muscular imbalance • Strength test • Manual muscle testing • College going students

## INTRODUCTION

The condition known as 'Unterkreuz syndrome' is also referred to as pelvic crossed syndrome, lower crossed syndrome, or distal crossed syndrome.<sup>1</sup> Lower crossed syndrome (LCS) arises from muscular imbalances in the lower body. These imbalances occur when

muscles are persistently shortened or elongated relative to each other.<sup>2</sup> LCS is characterized by specific patterns of muscle weakness and tightness that cross between the body's dorsal and ventral sides.<sup>3</sup> In LCS, the hip flexors and lumbar extensors become overactive and tight, while the deep abdominal muscles on

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the ventral side and the gluteus maximus and medius on the dorsal side are underactive and weak.<sup>4,12</sup> The hamstrings are often tight in this condition as well. This muscle imbalance leads to an anterior pelvic tilt, increased hip flexion, and compensatory hyperlordosis in the lumbar spine.

LCS involves weakness in several trunk muscles, including the rectus abdominis, internal and external obliques, and transversus abdominis, as well as in the gluteal muscles: gluteus maximus, gluteus medius, and gluteus minimus.<sup>5,6,7,13</sup> These muscles become inhibited and substituted by the activation of superficial muscles. Simultaneously, there is overactivity and tightness in the thoracolumbar extensors, including the erector spinae, multifidus, quadratus lumborum, and latissimus dorsi, as well as in the hip flexors, including the iliopsoas and tensor fasciae latae.<sup>8,9</sup>

**Type A:** The first subgroup is known as posterior pelvic crossed syndrome. In this type, there is dominance of the axial extensor muscles due to shortened hip flexors. The pelvis tilts anteriorly, and the hip and knee are in slight flexion. This is accompanied by anterior translation of the thorax due to increased thoracolumbar extensor activity, resulting in compensatory hyperlordosis of the lumbar spine and hyperkyphosis at the thoracolumbar junction.<sup>11</sup>

**Type B:** Also referred to as anterior pelvic crossed syndrome, this subtype involves weak and short abdominal muscles. The compensation manifests as minimal hypolordosis in the lumbar spine, hyperkyphosis in the thoracic spine, and head protraction.

**Signs and Symptoms:** Symptoms may include reduced mobility or stiffness in the lumbar, hip, hamstring, or pelvic regions, pain in the hip flexors, groin, spine, or buttock muscles, a protruding abdomen due to excessive lumbar arching, and tension in the lower back and buttock muscles.

## MATERIAL AND METHODOLOGY

### Materials

Pen, Paper, Goniometer, Harris Hip Functional Scale, Consent Form, Assessment Form, Laptop

### Methodology

This observational study was conducted over a duration of three months at RK University,

involving a sample of 100 college students selected using a convenient sampling method.

### Inclusion Criteria:

The study will include both male and female students studying at RK University, aged between 18 to 25 years, who are required to sit for at least 6 to 7 hours daily.

### Exclusion Criteria:

Students with a history of spinal trauma, joint dysfunction within the past three months, or congenital deformities at the hip or lumbar region will be excluded. Additionally, those with recent fractures involving related joints within the past six months, a history of abdominal, hip, or lumbar surgery within the past three months, or those unwilling to participate in the study will not be considered.

The current study was conducted at RK University in the period from (November-January) to evaluate the prevalence of lower cross syndrome in college going students. After getting ethical clearance from the ethics committee of the institution the consent forms were given to all the students of age between 18-25 yrs. consent 100 students were obtained.

Detailed instructions and procedure were given to the subjects about study with written consent. Subjects who were full filling inclusive and exclusive criteria of study were allowed to participate in the study.

## RESULT

Data was collected on data sheet and encoded for computerized analysis. Tables & pie chart were made using Microsoft word and figures were plotted using Microsoft excel.

14% of total population have lower cross syndrome i.e. 14 subjects out of total 100 subjects have lower cross syndrome.

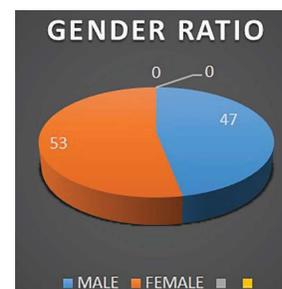


Figure 1: Gender Ratio

The above pie chart shows that out of 100 subjects 53 were female and 47 were males.

Therefore majority of subjects population is of females.

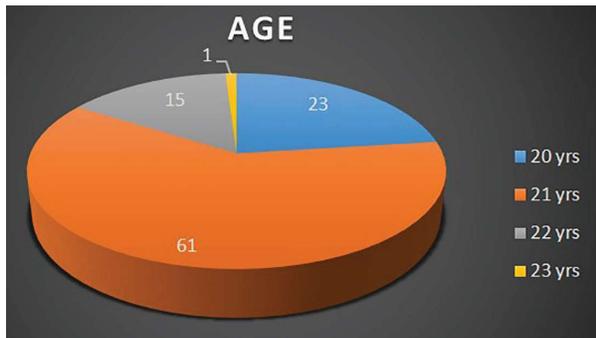


Figure 2: Age Ratio

23 subjects are of age group 20 years, 61 subjects are of age group 21 years, 15 subjects are of age group 22 years, 1 subject is of age group 23 years

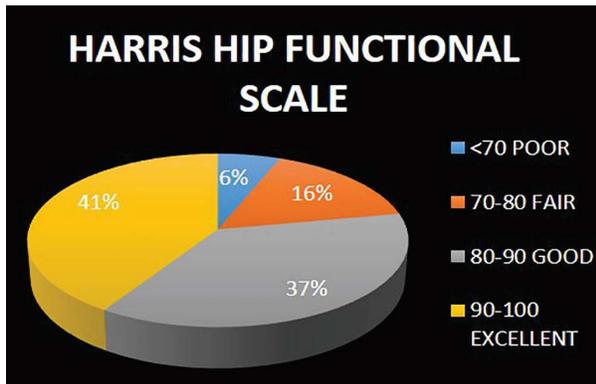


Figure 3: HHFS

The above pie chart shows that total HHFS score is 100 and out of which 14% subjects are at greater risk of having lower cross syndrome and 86% subjects are normal individual.



Figure 4: Abdominal Strength

**Abdominal strength:** The above graph shows abdominal strength of the subjects which was tested using manual muscle testing out of which 25% were having grade 3, 69% were having grade 4, 6% were having grade 5. So,

maximum of the subjects were having MMT Grade 4

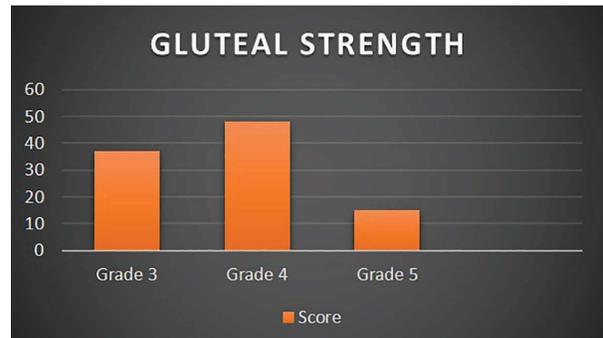


Figure 5: Gluteal Strength

**Gluteal Strength:** The above graph shows the gluteal strength of the subject which was tested using manual muscle testing out of which 37% were having grade 3, 48% were having grade 4, 15% were having grade 5.

So, here maximum of the subject was having MMT Grade 4.

## DISCUSSION

The aim of the current study was to investigate the prevalence of lower cross syndrome (LCS) among college students. LCS is a muscle imbalance condition that typically involves weakness in the abdominal and gluteal muscles, paired with tightness in the hip flexors and spinal extensors. This imbalance can lead to postural issues and discomfort, and is typically diagnosed when muscle imbalances are present alongside a low Harris Hip Function Score (HHFS), which should be less than 60 to indicate poor hip function.

In this study, however, it was observed that 86% of the students had excellent hip function, as reflected by HHFS scores between 90 and 100. This high percentage of students with optimal hip function suggests that the majority of participants maintain good muscle strength and flexibility, possibly due to their engagement in regular physical activity such as sports, gym workouts, and other physical activities. Consequently, the prevalence of lower cross syndrome among the college student population was found to be very low, with only 14% showing signs of the condition. This supports the notion that active lifestyles, particularly regular participation in sports and exercise, may significantly reduce the likelihood of developing lower cross syndrome, highlighting the importance of

physical activity in preventing musculoskeletal disorders.

## CONCLUSION

The study concludes that there is very low prevalence (14%) of LCS in collage going students.

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