

**EFFECTIVENESS OF STRETCHING AND STRENGTHENING EXERCISE PROTOCOL
(JANDA'S APPROACH) IN COLLEGE GOING STUDENTS WITH LOWER CROSSED
SYNDROME -AN EXPERIMENTAL STUDY**

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ABSTRACT

Objective: The main objective of the study was to find out the effectiveness of stretching and strengthening exercises (Janda's Approach) in College going students with lower crossed syndrome.

Methodology: 50 Students between the ages of 18 to 25 years were screened for lower crossed syndrome and 20 students were screened positive for lower crossed syndrome and were selected for the study. The treatment program was conducted for 4 weeks, scheduled for 16 sessions. The outcome measures were manual muscle testing of the abdominal muscles and gluteal muscles and modified schober test for lumbar flexibility and modified thomas test for hip flexor tightness which were recorded before and after treatment sessions

Results: There was increase in strengths of abdominal muscles and gluteal muscles after 4 weeks treatment (p value < 0.001) which was statistically significant and there was reduction in tightness of hip flexor muscles and lumbar flexor muscles (p value < 0.001) which was statistically significant

Conclusion: On the basis of results of our study we concluded stretching and strengthening exercises (Janda's Approach) are effective in treating lower crossed syndrome in college going students

Keywords: Lower Crossed Syndrome, Janda Approach, Physiotherapy, Strengthening And Stretching Exercises

INTRODUCTION

Lower Crossed Syndrome is a musculoskeletal condition characterized by different patterns of muscular weakness and tightness that connect the dorsal and ventral sides of the body . It is also referred to as Pelvic Crossed Syndrome or Underkruz Syndrome .This is a postural distortion

syndrome that affects the lower kinetic chain(1) It is characterized by the tightness of the thoracolumbar extensors on the dorsal side crosses with the tightness of the iliopsoas and rectus femoris as well as weakness of the deep abdominal muscles ventrally crosses with weakness of the gluteus maximus(2).

Lower crossed syndrome tends to affect systems and muscles found there. The sciatic nerve and its many branches are eligible to be affected, from shooting pain to muscle tightness to range of motion problems in hips and ankles(3).

The most frequent cause of Lower Crossed Syndrome is a sedentary lifestyle to a large extent of modern day living and working conditions, sitting for extended periods of time can lead to an imbalance between the muscles and if LCS is not treated, it can lead to obesity and low back pain in future (4). It can also arise as a result of a variety of situations , including chronic, recurrent acts. It can have a negative impact on the body mechanics, such as immobilization, disuse or chronic postural pain, as may long periods of prolonged sitting and poor posture in college all day at workplace (5).

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(6). Joint dysfunction occurs as a result of this pattern of imbalance, particularly at the L4 – L5 and L5 – S1 segments, the sacroiliac joint, and the hip joint(7). Prolonged incorrect posture and reduced physical activity presents an imbalance in the musculature(8).

Significance

To find out the effectiveness of stretching and strengthening exercise programme in college going individuals with lower crossed syndrome

To make them aware about this muscular imbalance and need to get proper and timely management through Physiotherapy

OBJECTIVES

To screen for lower crossed syndrome in asymptomatic individual

To stretch the tighten group of muscles and to strengthen the weaker group of muscles for proper muscle balance

MATERIALS AND METHODOLOGY

The study was conducted at NRI College of Physiotherapy, Department of Physiotherapy, over a duration of 12 months. The study design employed

was a pre- and post-experimental design, involving a sample size of 20 subjects who fulfilled the screening criteria for lower crossed syndrome. The materials used included a non-elastic measuring tape and a marker. The participants, comprising boys and girls aged 18-25 years, were asymptomatic individuals who voluntarily agreed to participate in the study. The inclusion criteria consisted of subjects meeting the screening criteria, being within the specified age group, and providing informed consent. Conversely, the exclusion criteria included subjects not meeting the screening criteria, those under 18 years old, individuals with a history of spinal trauma or lower limb surgery, and those with congenital deformities in the hip or lumbar region.

Obtained at two occasions ,pre intervention and post intervention measurements

- Manual Muscle Testing (MMT) Grading for Abdominals muscle.
- Manual Muscle Testing (MMT) Grading for Gluteus maximus muscle.
- Schober Test for examining the flexibility of the lumbar spine.
- Thomas Test for examining the hip flexibility.

After examining all the subjects who were screened positive for lower crossed syndrome were taken into a group

The treatment protocol was set for twelve months . Preintervention measurements were noted for each subject

Followed by stretching protocol for the iliopsoas, rectus femoris and erector spinae along with the strengthening of the abdominals and the gluteal muscles for 10 repetitions of 3 sets

After the completion twelve months intervention, outcome measures were recorded for each subject and data analysis were done by comparing the pre and post value

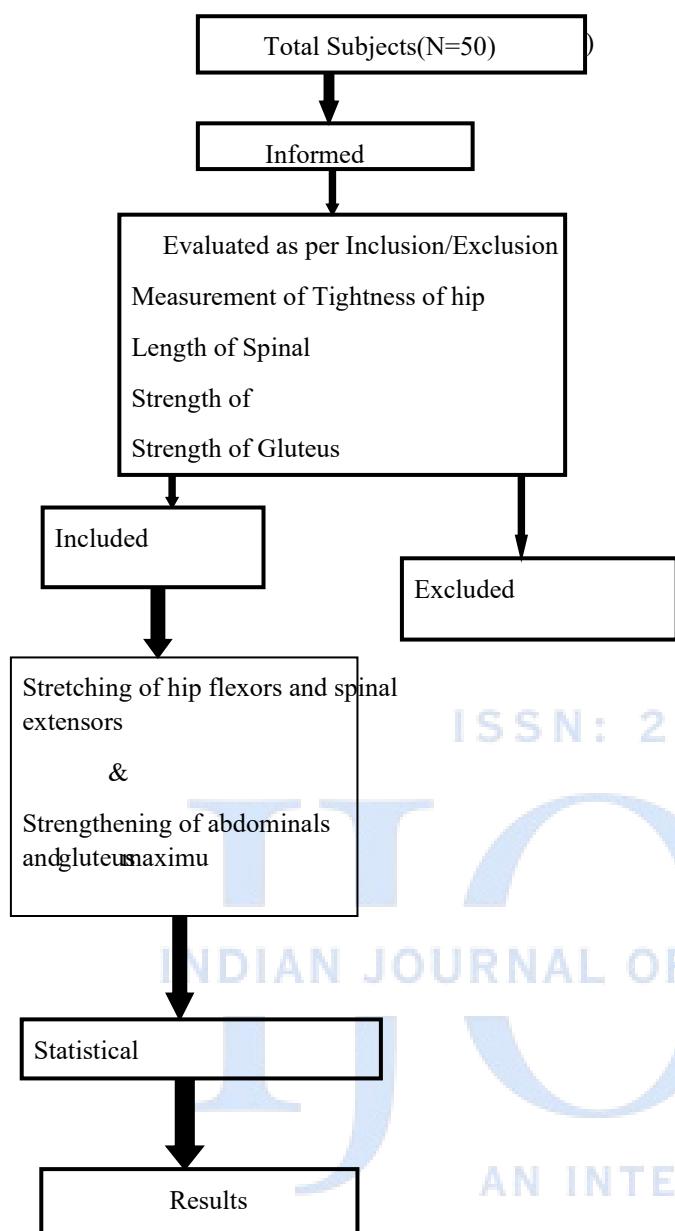
RESULTS

Table 1 : Demographic variables (Descriptive statistics) N=20

S. N o	Variabl es	Mea n	Medi an	Stand a rd Deviati on	Min i mu m	Ma xi mu m	P- Valu e
1	Age	22.1	22.0	1.17	20	24	<0.005
2	BMI	25.0	24.9	3.95	18.3	36.7	<0.005
3	Gender						
	Female- 90% (N=18)						

Male- 10% (N=2)							<0.005
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Table 2 :Parameters of Spinal Length

Clinical variables	Mea n	Media n	Standar d Deviatio n	Min i mu m	Max i mu m	P- Value
Pre-spinal length(cm)	17.0	17.0	0.459	16.5	17.5	<0.001
Post-spinal length(cm)	21.2	21.5	1.58	18.0	23.0	<0.001

Table 3 :Parameters of Gluteal Muscle strength

Clinical variables	Mea n	Media n	Standar d Deviati on	Min i mu m	Ma xi mu m	P- Valu e
Pre-MMT Grade for Gluteal(Right)	4.0	4.00	0.00	4	4	<0.001
Pre-MMT Grade for Gluteal (Left)	4.0	4.00	0.00	4	4	<0.001
Post-MMT Grade for Gluteal (Right)	4.85	5.00	0.366	4	5	<0.001
Post-MMT Grade for Gluteal (Left)	4.90	5.00	0.308	4	5	<0.001

Table 4 :Parameters of Abdominal Muscle strength

Clinical variables	Mea n	Media n	Standar d Deviatio n	Min i mu m	Max i mu m	P- Value
Pre-MMT Grade f or Abdomina ls	4.00	4.00	0.00	4	4	<0.00 1
Post- MMT Grade f or Abdomina ls	4.80	5	0.40	4	5	<0.00 1

DISCUSSION

Table 1 : The demographic data of the participants showed

The studied group consisted of 20 subjects out of which, the gender distribution with females (n=18) comprising (90%) of the participants and males (n=2) comprising (2%) of the participants

In terms of age, with a mean age of 22.1 years (SD = 1.17) and a median age of 22.0 years. The age range was narrow, spanning from 20 to 24 years.

In terms of BMI, the mean was 25.0 (SD = 3.95), with a median of 24.9. The BMI range was slightly wider, spanning

18.3 to 36.7.

Table 2 :The parameters of spinal length of the participants showed

In table 2 the pre-spinal length (cm) the mean was 17.0 (SD=0.459) and the post-spinal length (cm) the mean was 21.2 (SD= 1.58).

The pre-spinal length (cm) ranges from 16.5 to 17.5 and the post-spinal length (cm) ranges from 18.0 to 23.0

Pre and Post test comparison: Paired t-test is used to compare the means of pre and post intervention of

the dependent variable for parametric data for each subject.

When the data was analyzed, there is a significant difference in the outcome measures with a p value of < 0.001, indicating there is an improvement in the spinal length

Table 3 : The parameters of Gluteal muscle strength of the participants showed

In table 3 the pre- MMT grade for gluteus (Right) the mean was 4.0 (SD=0.00) and the post- MMT grade for gluteus (Right) the mean was 4.85 (SD=0.366)

The pre- MMT grade for gluteus (Left) the mean was 4.0 (SD=0.00) and the post- MMT grade for gluteus (Left) the mean was 4.90 (SD=0.308)

Pre and Post test comparison: Paired t-test is used to compare the means of pre and post intervention of the dependent variable for parametric data for each subject.

When the data was analyzed, there is a significant difference in the outcome measures with a p value of < 0.001, indicating there is an improvement in the strength of gluteal muscles

Table 4: The parameters of Abdominal muscle strength of the participants showed

In table 4 the pre-MMT grade for Abdominals the mean was 4.00 (SD=0.00) and the post- MMT grade for Abdominals the mean was 4.80 (SD=0.40)

Pre and Post test comparison: Paired t-test is used to compare the means of pre and post intervention of the dependent variable for parametric data for each subject.

When the data was analyzed, there is a significant difference in the outcome measures with a p value of < 0.001, indicating there is an improvement in the strength of Abdominal muscles

Parameters of Thomas Test

The pre- Thomas test for right , 20 subjects tested positive and post Thomas test for right , 19 out of 20 subjects tested negative and only 1 subject tested positive

The pre- Thomas test for left, 20 subjects tested positive and post - Thomas test left, 19 out of 20 subjects tested negative and only 1 subject tested positive.

Pre and Post test comparison: Paired t-test is used to compare the means of pre and post intervention of the dependent variable for parametric data for each subject.

When the data was analyzed, there is a significant difference in the outcome measures with a p value of < 0.001, indicating there is an improvement in the Thomas test,

LIMITATIONS OF THE STUDY :

This study has several limitations. Firstly, it was a short-duration study, and the lack of long-term follow-up made it difficult to assess the consistency and long-term effects of the treatment. Additionally, the study's sample population was limited to subjects between 18 and 25 years of age, which may not be representative of other age groups. Furthermore, the study had inadequate gender distribution, which could potentially impact the generalizability of the findings.

FUTURE RECOMMENDATIONS :

Future studies should consider the following recommendations. A longer study duration is required to assess the long-term effects of the intervention. Multi-center trials with long-term follow-up can be conducted to evaluate the carry-over effect and provide more comprehensive insights. Additionally, a larger sample size would enhance the study's generalizability and statistical power. Furthermore, ensuring equal gender distribution in the sample population would improve the study's validity and applicability to diverse populations

CONCLUSION

In conclusion this study demonstrates that a Stretching and strengthening exercise protocol positively influences the performance of lower crossed Syndrome subjects. Both the stretching and strengthening, i.e Janda's approach is efficient in treatment of lower crossed syndrome which led to significant improvements. The present study findings of college going students with lower crossed Syndrome suggests that recommended

exercise program includes stretching the tight musculature and strengthening the weak musculature is more effective in lower crossed syndrome. Females are more likely to develop lower crossed syndrome due to sedentary lifestyle and less physical activity compared to males

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For study protocol: NRI Academy of Medical Sciences, College of Physiotherapy approved the research protocol involving the human participants

Conflict of interest: No conflicts of interest

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Authors contribution statement:

Drafting of the manuscript: Leela.P

Agreed to be accountable for all aspects of the work : Leela.P

Review of the final version to be published : Leela. P

Substantial contributions to concept and design: Praniti

Acquisition, analysis, or interpretation of data:
Praniti

Critical review of the manuscript for important intellectual content: Praniti

Supervision: Rajesh.B

Data sharing statement: All data relevant to the study are included in the article

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