

Original article:

Correlation of lumbosacral angle with core muscle endurance in patients with chronic low back pain

Miss. Sheetal Ashok Mahadik*, Dr. Deepak Anap Dr. Abhijeet Diwate****

Intern *, Associate Professor**

PDVVPFs College of physiotherapy, Opp. Govt Milk Dairy, Vilad Ghat, Ahmednagar, India

Corresponding author email: mahadiksheel21@gmail.com

Abstract

Background - Low back pain affects 60% individuals in life. Postural changes may also be risk factor for low back pain. Abnormal posture creates a strain on ligaments and muscles that indirectly affects the curvature of the lumbar spine. Low back pain can be because of muscle overuse, muscle strain, and /or injuries to the muscles, ligaments, and discs that support the spine. The lumbosacral angle is the angle formed between the long axis of the lumbar vertebrae and the sacrum. Lumbosacral angle may be one of the contributing factors in producing low back pain (LBP) and disability.

Method- The Institutional Ethical Committee was obtained for the study. All the subjects had signed written informed consent before participating in the study. Study design was cross sectional study. Using lateral view of radiographs lumbosacral angle was calculated on the PACS. Core muscle endurance subject was tested by using prone double SLR test.

Result- Core muscle endurance was reduced in patients with chronic low back pain. There was negative correlation ($r = -0.1912$) present between core muscle endurance and lumbosacral angle.

Conclusion-Muscle endurance is found to be reduced in patients having chronic low back pain, where as endurance is found to be more in males as compared to females; and also negative correlation is present between core muscle endurance and Lumbosacral angle, in patients with chronic low back pain

Key words -Low back pain, Lumbosacral angle, Endurance, Prone double SLR

Introduction –

Low back pain is a common condition comprising a major health problem worldwide. It will eventually affect almost everyone in life, men and women equally¹

The lifetime prevalence of low back pain is estimated at 60-85%, while the annual prevalence in the general population is ranging from 15-45%². The annual incidence of back pain in the general population is estimated between 10%-15%.³. Some factors have been suggested to influence its degree as age, gender, race, occupation, weight, height, abdominal and back muscles' strength, lifestyle, physical activity, hormonal factors, deformity of spine, and changes in the inter-spinal discs and

sacrum changes in lordosis⁴. The core is the centre of the functional kinetic chain that is the human body and core needs to be stable in order for humans to have sustainable healthy postures and to successfully move limbs and perform functional tasks⁵. Poor back muscle endurance was correlated to increased periods of sitting and lower physical activity of the lumbar spine, such as standing. Possible causes of reduced back muscle endurance might include disuse through inactivity, altered motor control patterns or prolonged passive system loading associated with reduced activity of spinal stabilising muscles⁶. There is lack of literature on co relation of Lumbosacral angle with back muscle endurance in chronic low back pain patients. Hence

this study was undertaken to find out co relation of Lumbosacral angle with back muscle endurance in chronic low back pain patients.

Materials & Method -

The Institutional Ethical Committee approval was obtained for the study. All the subjects had signed written informed consent before participating in the

study. Study design was cross sectional study. Core muscle endurance was tested by using Prone Double SLR test in patients with and without low back pain (photo no 1&2). By using lateral view of radiographs, lumbosacral angle was calculated on the PACS. (Photo No. 3)

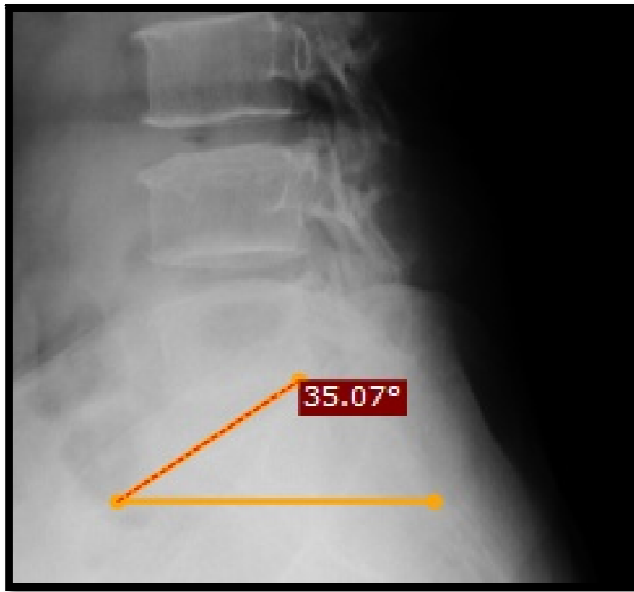
Photo no 1 – Prone double SLR Test Position



Photo no 2 – Prone SLR end position



Photo no 3 – Radiograph of Lumbosacral angle



Result –

Table No – 1 Demographic presentation of LSA and core muscle endurance

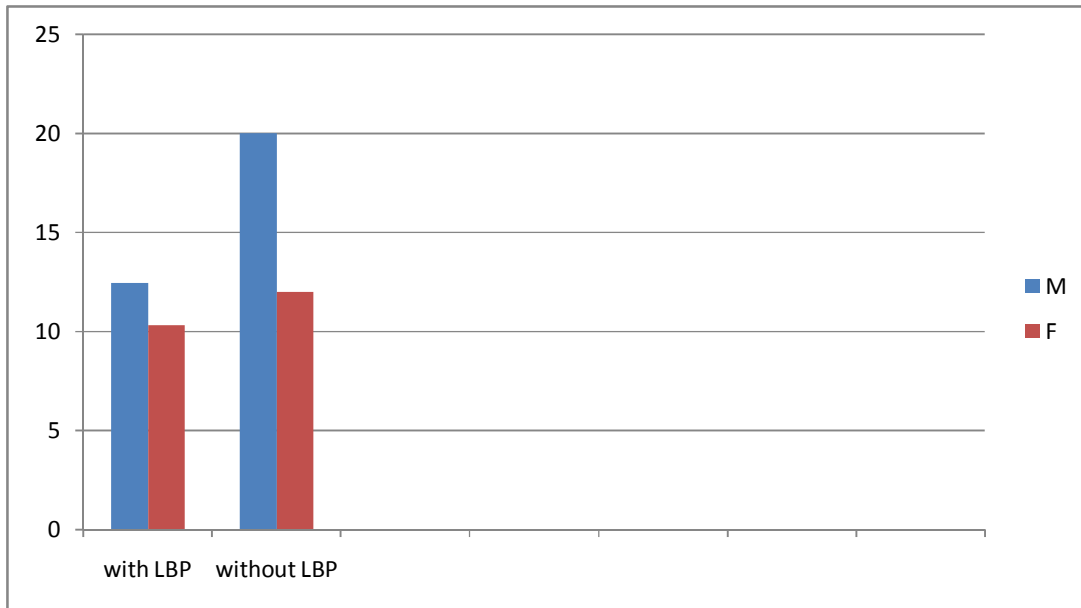
	With LBP		Without LBP	
	M	F	M	F
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Age	44 ± 4.14	46 ± 3.21	44.6 ± 4.27	46.3 ± 3.92
Sex	7	13	10	10

Table No 2-Comparison of Core muscle endurance between low back pain (LBP) and without low back pain

With LBP		Without LBP		T Value	P Value
M	F	M	F		
12.42	10.29	19.99	12	2.9180	0.0059

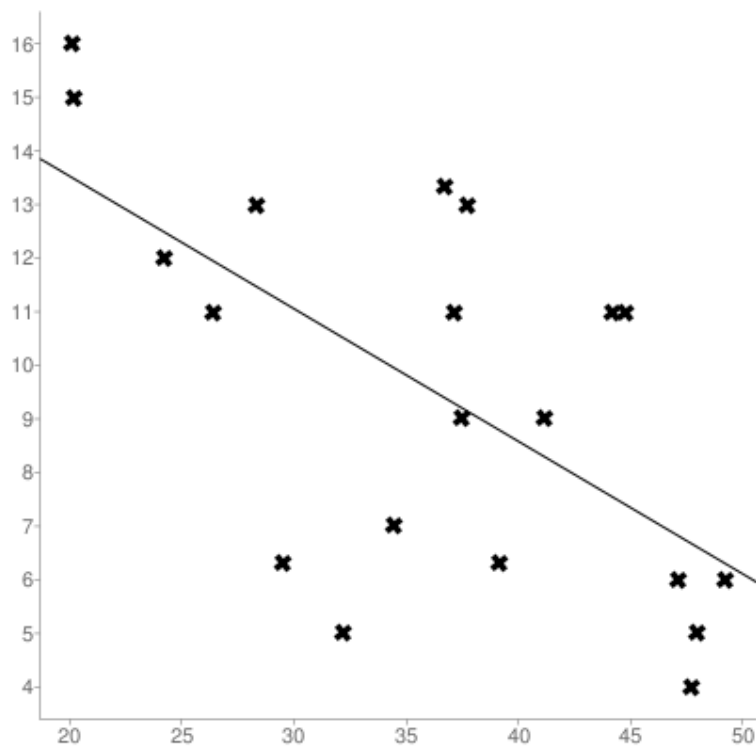
Core muscle endurance was more in males without low back pain (19.99) as compared to males with LBP (12.42). On comparison of endurance between subjects with and without low back pain , was

analysed using unpaired ‘t’ test , where the ‘p’ value was 0.0059 and ‘t’ values 2.9180. These values are considered to be highly statistically significant.(Table -2)



Graph No 1- Comparison of Core muscle endurance in subjects with and without LBP .

Graph – 2 Correlation of LSA with core muscle endurance in subjects with Low back pain



When correlation was analysed between core muscle endurance and Lumbosacral angle using Pearson’s correlation coefficient the r value was found to be – 0.6301. Which showed that there was a negative correlation between core muscle

endurance and lumbosacral angle in patients with LBP.(Graph -2)

Discussion -Our study was to find out Correlation of core muscle endurance with Lumbosacral Angle in patient with chronic low back pain. The result of

present study demonstrated that, the core muscle endurance was reduced in patients with chronic low back pain. We also found that muscle endurance is good in normal individual. These results are in consistent with the study by Holmstrom et al, who assessed endurance in construction workers with and without LBP. His study reported significant differences in their endurance time based on LBP history⁷. Possible causes of reduced back muscle endurance might include disuse through inactivity, altered motor control patterns or prolonged passive system loading associated with reduced activity of spinal stabilising muscles⁸

Our study also found that there is negative correlation present between core muscle endurance and lumbosacral angle in patients with chronic low back pain, where r value : -0.6308, which indicates negative corelationship. The result of study is in consistent with the study by Ganer Naveen et al. In his study he concluded that endurance of trunk extensors has strong relationship with pain and disability in the people suffering from low back

pain. They also found that as the endurance of trunk extensors decreases the pain increases⁹

In the present study we found that in the patients with and without low back pain, the core muscle endurance is more in males than in the females. Study result is in consistent with the study by McGraw-Hill, “ In muscular strength and endurance ” he found endurance of males is more than females. Poor back extensor muscle endurance is an important factor for low back pain. Due to genetic and hormonal differences, men built more muscle mass than women¹⁰

Conclusion -From our study we conclude that core muscle endurance is reduced in subjects with low back pain. We also found that there is a negative correlation between core muscle endurance and lumbosacral angle in subjects with chronic low back pain. Study also conclude core muscle endurance is more in males than females

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Conflict of Interest: None

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