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Association of gluteus medius strength and disability in patients with chornic low back pain

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Abstract
Background: Hip abductor muscles plays a significant role in pelvic lateral stability; any imbalance in these muscle functions can lead to Low Back Pain.
Aim: To study association of gluteus medius strength and disability in patients with Chronic Low Back Pain.
Objectives
1. To assess strength of gluteus medius by MMT grades in patients with chronic LBP.
2. To assess functional strength of abductor muscles using sing limb squat test in patients with chronic LBP
3. To assess the functional disability using Modified Oswestry low back disability index in patients with chronic LBP.

Methodology: Permission was taken from concerned ethical committee and consent was taken from the subjects. An analytical study was done on 60 individuals, selected on the basis of inclusion criteria & exclusion criteria.Inclusion criteria which is both male and females, age group 30-60, subjects with non-specific LBP &exclusion criteria which is recent fracture, Any associated disorder, Limb length discrepancy. Abductor muscle strength was assessed according to MMT grades. Abductor muscle functional strength was assessed using Single Limb Squat Test. Functional disability was assessed using Modified Oswestry Low Back Disability Index.
Result: The data was collected and subjected by statistical analysis. The results shows patients with CLBP reduced gluteus medius strength with grade 2. There was significantly reduced functional strength of gluteus medius in patients with chronic low back pain according to single limb squat test
Modified oswestry score shows 86% disability in patients with low back pain.
Conclusion: Decreased Gluteus medius strength and disability can be consider as important factor associated with chronic low back pain

Keywords: Low back pain, gluteus medius weakness, modified oswestry disability index, abductor muscle

Introduction
Low back pain (LBP) is a common complaint with the lifetime prevalence estimated to be as high as 84% Indian population.[1] Nearly everyone is experiencing it once in there working hours. For most cases of the low back pain it gets neglected and many of them go back to their job without any disability but this ignored pain gradually reflect as chronic low back pain, regardless of any advice or treatment they receive. A small proportion, however, develop chronic pain and disability. Once this ignored low back pain last more than 6 months to 1 years it starts reflecting on their daily activities. The most common age group for low back pain is young adult's i.e. 25 year of age to old adults i.e. 65 year of age as this age group comes under working population for more than 8 hours/day[2.]These account of 80% of low back pain and are due to mechanical causes of life back muscle strains, ligaments sprain and disk problems (lumbar disk disease). The muscle strain sand sprains are due to sudden unaccustomed activates and improper postures. The spinal mobility, functions as a shock absorbers, all spines degenerate with advancing age and so does the intervertebral disks. Degenerative process is divided into three stages. Stage of dysfunction ; Stage of instability ; Stage of stabilization Low back pain is a secondary cause for postural dysfunction which later on reflects in muscular imbalance which leads to misalignments of joints because of abnormalities in biomechanics of joint functions [3-4].

The primary function of hip abductors is to stabilize the femoral head in the acetabulum during different parts of the gait cycle. Hip abductor muscles group play a vital role in gait. The gluteus medius muscle is usually active with providing lateral stability to lower lumbar region. So any imbalance in this group muscles function leads to disturbance in low back, which gives rise to the low back pain in patients [3-4]. So, when these group muscle get affected it alters gait pattern. The altered gait pattern in return reflects on low back region. Ignorance of this mild pain converts it into a chronic low back pain. Low back pain is a secondary cause for postural dysfunction which later on reflects in muscular imbalance which leads to misalignments of joints because of abnormalities in biomechanics of joint functions. So, it becomes very important to study the abductor muscle functioning and it's correlation with low back pain.

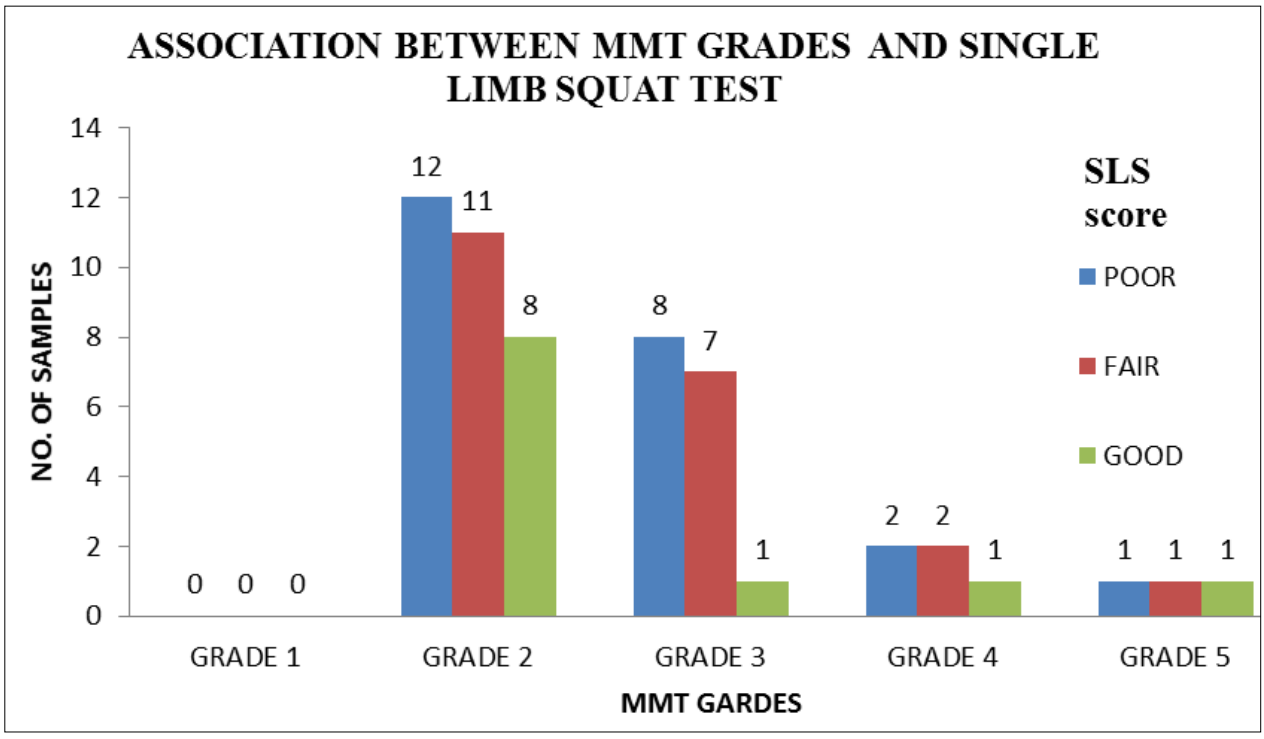
Methodology

An analytical study was done on random selection of 60 individuals with chronic low back pain which were selected on the basis of inclusion criteria & exclusion criteria. Inclusion criteria which were patients with nonspecific LBP Age group between 25-65 years, Both genders male and female, Non exercising patients, Subjects willing to participate, low back pain more than 6 months and Exclusion criteria which were Recent surgeries, Recent fracture, Any associated diseases, Limb length discrepancy, Cognitive issues, Any disabled subject. Permission was taken from the Institutional Ethical Committee of Tilak Maharashtra Vidyapeeth Department of Physiotherapy. The aim and method of the study was explained to the individuals and their consent on the consent form was taken. Demographic data was filled by individuals. Abductor muscle strength was recorded of the individuals by oxford manual muscle grades. Functional strength was recorded using Single Limb Squat Test. The participants were asked to perform single leg squat under guidance and according to the performance participants were rated Good if able to achieve 4criteria among 5, Fair if able to achieve any 1-2 criteria among 5 and Poor if participant fail to achieve a single requirement of any one criteria, Functional disability of each individual was recorded using Modified oswestry low back disability score. Data was collected as subjected to statistical analysis.

Statistical Analysis

Table 1: Association between MMT grades and Single limb squat test

MMT	Single Limb Squat Test		
Grades	Poor	Fair	Good
Grade 1	0	0	0
Grade 2	12	11	8
Grade 3	8	7	1
Grade 4	2	2	1
Grade 5	1	1	1

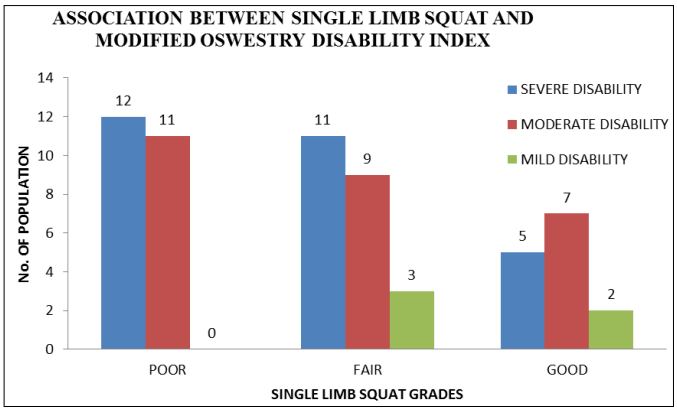


Graph 1: Association between MMT grades and Single limb squat test

Interpretation: The graph shows participants with reduced muscle strength i.e grade 2 has Poor functional strength by single limb squat test.

Table 2: Association between single limb squat and modified oswestry disability index

Single Limb Squat	Severe disability	Moderate disability	Mild disability
Poor	12	11	0
Fair	11	9	3
Good	5	7	2



Graph 2: Association between single limb squat and modified oswestry disability index

Interpretation: The graphs shows participants with poor grade by single limb squat test has sever disability by modified oswestry disability index.

Result

There was significantly highest incidence of decreased abductor muscle strength in chronic low back pain participants with grade 2 there was significantly reduced functional strength of gluteus medius in patients with chronic low back pain according to single limb squat test Modified Oswestry shows 44% with sever disability, 40% with moderate disability and 16% with mild disability.

Participants with poor grade by single limb squat test have severe disability by modified oswestry disability index. And with fair grade by single limb test has moderate disability and good grade participants has mild disabilities.

Discussion

Low back pain was recently announced as largest common cause of disability across the globe. It is a most common disability causing problem in occupational workers. Movement System Impairment (MSI) classifies low back pain into one of five movement categories. Use of this classification system has been demonstrated reliable in low back pain patients [5].

Low back pain is a secondary cause for postural dysfunction which later on reflects in muscular imbalance which leads to misalignments of joints because of abnormalities in biomechanics of joint functions. The study shows highest score of cognitive impairment related to work related issues as compared to physical activity [6].

Among 80 participants with chronic low back pain 79 were matched for criteria based on inclusion and exclusion among which 19 dropped out and research was conducted on 60 finalized participants Research focuses on age of 25 to 65 year age population as this population is occupationally working and active population so shows maximum incidence of low back pain. Among the participants maximum participants shows decreased abductor muscle strength.

Several authors have reportable direct interactions between abductor pathology and low back pain. One in every of the sooner works implicating glute as a supply of low back pain was of glute myofascial pain. Myofascial pain from the glute muscle has been reportable to be a typical element of low back pain. They describe pain referred from glute as presenting medial toward the bone, superiorly on the iliac crest additionally as throughout the body part. Later Reportable finding glute myofascial trigger points in thirty second of a sample of patients seeking look after low back pain 11 samples during a management population. They outlined trigger points as scrutiny tenderness and either recognition of this tenderness as their pain criticism or involuntary contraction of the muscle in response to touching. These studies counsel that pain from the glute muscle plays a task in low backpain [7].

The study shows abductor muscle strength score was significantly reduced in the participants which reflects on function of gluteus medius due to abnormal mechanical forces. Function of gluteus medius was assessed using Single limb squat test which is considered as valid outcome for pelvic stability which includes with balance, knee, hip and trunk biomechanics among this most affected components are pelvic and trunk this factors directly reflects on sever to moderate disability in patients with chronic low back pain.

In addition to myofascial pain, relative weakness of the hip abductors had been reported in individuals with LBP. Hip abductor strength additionally as hip skeletal muscle, flexor, and skeletal muscle strength during a massive sample of individuals with LBP compared to an effect population. Later these authors reportable significantly lower hip abductor strength in folks with low back pain compared to controls without low back pain.

The interaction between hip function and LBPhas been suggested to play a role in subgrouping patients with LBP. The relationship between trochanteric bursitis, or greater trochanteric pain syndrome (GTPS), as it is more widely and properly termed, and low back pain has been supported by several studies [8]. Trochanteric bursitis as the actual problem in 30% of elderly adults seeking care for low back pain. The recent study represents maximum correlation of lumbar muscles and hip musculature relation with low back pain.

Conclusion

Decreased Gluteus medius strength can be considered as important factor associated with disability in chronic low back pain patients.

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