



INFLUENCE OF ABDOMINAL AND HAMSTRING MUSCLE ACTIVATION EXERCISES OVER ILIOTIBIAL BAND STRETCHING ON A POSITIVE OBER'S TEST IN SUBJECTS WITH LOW BACK PAIN

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ABSTRACT

Background and Purpose: To check the immediate influence of abdominal and hamstring muscle activation exercises over iliotibial band stretching on pain level as measured by VAS and hip adduction range

Methods: 30 subjects with low back pain and positive ober's test were randomly allocated into two groups. Group A was provided with passive stretch on Iliotibial band. And Group B completed exercises to recruit abdominal and hamstring muscle which are developed by Postural Research Institute

Results: Significant increase in passive hip adduction range ($p < 0.01$) and decrease in pain ($p < 0.01$) was identified in Group B

Conclusion: Exercises activating Abdominal and Hamstring muscle shows immediate effect by improving ober's test and reduce low back pain.

KEYWORDS : Ober's test, Iliotibial band Syndrome, Abdominal muscle activation, Hamstring muscle activation.

INTRODUCTION:

Low back pain is extremely common problem that most people experience at some point in their life with lifetime prevalence reported to be as high as 84% by World Health Organization (WHO). and is defined as fatigue, uneasiness or soreness in low back region, with or without radiating symptoms to the lower limb. It is classified as acute, subacute and chronic low back pain according to duration. Back pain affects about 85% of population and is the major disability in those beneath age of 45. It is the most exclusive health problem a physiotherapist treats on daily basis. In India occurrence of low back pain is also alarming, it has been reported to be 23.09%.^[1]

Mechanical low back pain

Mechanical low back pain is defined as low back pain not attributed to specific recognisable known pathology (eg. Infection, tumour, osteoporosis, fractures, inflammatory process, radicular syndrome or cauda equina syndrome.)

Significance of Iliotibial band on low back pain Ober reviewed ITB tightness as a factor in sciatica and low back pain. Stretching of the iliotibial band is frequently recommended in treatment programs for patients with low back pain (LBP). Because the iliotibial band attaches to the ilium, tightness of this muscle is thought to cause anterior innominate rotation and lateral pelvic tilt.^[2]

Significance of abdominal and hamstring muscle activation on LBP

Recent case reports have documented that using hamstring activation or hamstring and abdominal activation can decrease pain and immediately increase passive hip adduction as measured Ober's

A fundamental approach used by the Postural Restoration Institute is the use of hamstring activation or hamstring and abdominal activation to influence Ober's test measurements.

Methods

The participants from physiotherapy OPD, Dr. D. Y. Patil College of physiotherapy, Pimpri, Pune were approached and explained about the study. It was performed at the outpatient department and college during working hours from 9am to 5pm. Subjects fulfilling the inclusion and exclusion criteria were selected from target population by simple random sampling method. 65 patients were screened out of which 30 patients were included in the study. 2 subjects were excluded from the study. All 30 subjects willingly

participated in the study and their written informed consent form was taken. Demographic data of the individual was recorded. Detailed assessment was taken from each individual. Instructions were given to the subjects regarding the techniques to be performed. Proper care was taken in terms of patient's privacy and physiotherapist's safety. The data was recorded in data recording sheets. After recording the demographic data, the following procedure was done.

PROCEDURE

Iliotibial band stretching Procedure

ITB static stretching static stretching, 3 times with 1 minute hold each with the patient positioned in side lying with hips and knees flexed aligning the shoulders with the hips and ankle with the legs stacked on top of each other. The therapist held the patients top leg with the forearm in supination supporting the lower leg and knee (90 degrees) while his other hand stabilized his pelvis. Upper leg was passively taken through the motions of the hip flexion, abduction, extension, and adduction.³

Abdominal and hamstring muscle activation exercises procedure-

1. 90/90 Hip lift with balloon

- Ask patient to Lie on back with feet on a wall and flex knees and hips at 90° angle
- Therapist have to Place a 4-6" ball between knees
- Ask patient to Place right arm above head and a balloon in left hand
- Ask patient to Inhale through nose and as exhale through mouth, ask to perform a pelvic tilt so that tailbone is raised slightly off the mat. Patient have to place low back flat on the mat. Patient should not press feet flat in the wall; instead have to dig down with heels
- Now ask to inhale through nose and slowly blow out into the balloon
- Ask to take 3 second pause, and After the fourth breath in, ask the patient to pinch the balloon neck and remove it from mouth. Let the air out of the balloon.
- Ask to Relax and repeat the sequence 4 more times.

2) 90/90 hemibridge with balloon.

- Patient have to Lie on back with feet on a wall and knees and hips bent at 90° angle.
- Ask the patient to Place a 4-6" ball between knees
- Ask to Inhale through nose and as exhale through mouth

- perform and ask to pelvic tilt so that tailbone is raised slightly off the mat.
- Ask to Take right foot off the wall. Ask Patient to feel the back of left thigh engage. Maintain this position for the remainder of the exercise.
- Now ask to inhale through nose and slowly blow out into the balloon.
- Ask patient to take Pause 3 seconds and After the fourth breath in, ask to pinch the balloon neck and remove it from mouth. Let the air out of the balloon.
- Ask to Relax and repeat the sequence 4 more times^[2].

Patients in the first experimental group (group A) received Iliotibial band stretching along with moist pack while the second (group B) received abdominal and hamstring muscle activation exercise along with moist pack. Patients randomized to the both interventional group were assessed at the beginning of the first session and after six sessions by the physiotherapist. The assessment of a detailed history with the duration of symptoms. The readings were measured on 1st day prior to treatment and the final reading was taken on the last day of treatment. After completion of 6 sessions, outcome measures- Visual Analogue Scale, Oswestry Low Back Pain Disability Index Questionnaire, Smart phone inclinometer and Pelvic Inclinometer were documented again. Raw data was made on master chart and further analysis was done.

Statistical Analysis

Data was analyzed for its statistical significance using appropriate software. Paired and unpaired t test were used to calculate values for VAS, Oswestry Low Back Pain Disability Questionnaire, Smart phone Inclinometer and Pelvic Inclinometer.

TABLE 1: Pre and Post Mean and p values of Group A

Group A			
Outcome Measures	Pre Mean	Post Mean	p value
VAS	6.40	3.40	< 0.001
ODI	39.233	20.533	< 0.001
Smart Phone Inclinometer	20	24.07	< 0.001
Pelvic Inclinometer	5.980	5.880	0.203

Table 1 shows mean and p values of VAS, ODI and smart phone inclinometer were significantly decreased while the p value of pelvic inclinometer was insignificant.

TABLE 2: Pre and Post Mean and p values of Group B

Group B			
Outcome Measures	Pre Mean	Post Mean	p value
VAS	6.13	2.73	< 0.001
ODI	36.40	18	< 0.001
Smart phone Inclinometer	23.07	26.73	< 0.001
Pelvic Inclinometer	6.320	6.233	< 0.001

Table 2 shows mean and p values of VAS, ODI, smart phone inclinometer and pelvic inclinometer were highly significant.

DISCUSSION

The findings in study concluded that stretching with hot pack was effective but abdominal and hamstring muscle activation exercises with hot moist pack were more effective statistically. Clinically, the effects in terms of pain, range, pelvic tilt and MODQ scores seen in the intervention group B (90/90 hip lift with balloon and 90/90 hemibrige with balloon)were maintained for a longer time as compared to the short term effects seen in the group A.

For Group A moist pack was given before Iliotibial band stretching because Application of heat to muscle is commonly advocated to enhance the efficacy of stretching.

Both the group showed significant decrease in pain levels measured by VAS. The decrease in pain levels could be attributed to the application of hot moist pack for 15 minutes in both the groups.

The reduced pain levels were better in the experimental group B This reduction may be due to the added benefit of the abdominal and hamstring activation exercise 90/90 Hip lift with balloon and 90/90 hemibrige with balloon exercise. Both these exercises relieve stress on the muscles, joints and ligaments associated with pain as the position of the pelvis is corrected to a more neutral position.

The hip adduction range of motion measured by smart phone inclinometer app showed significant changes in both the groups. But the hip adduction ROM was statistically highly significant in intervention group B. This was possible because of the exercises that are 90/90 hip lift with balloon which activates hamstrings bilaterally or 90/90 hemibrige with balloon which activates hamstrings unilaterally. In a person with the pelvis rotated forward in the transverse plane and anteriorly tilted in the sagittal plane, there will be posterior rotation of the pelvis with hamstring muscle activation on the same side. This helps to decrease lumbar lordosis and increase ipsilateral anterior rib internal rotation and this increases intra abdominal pressure. (IAP) An increase in the IAP along with rib depression, increased lumbar flexion and a posterior tilt will be achieved with blowing up of the balloon which will cause abdominal activation.

There was a significant change in the Modified Oswestry Disability Questionnaire score in the both the groups. In the intervention group B Modified Oswestry Disability Questionnaire score showed more significant result because of the Abdominal and Hamstring Muscle activation exercises which led to greater reduction in pain.

There was also significant change in pelvic inclination measured by pelvic inclinometer in Group B. This could be attributed to correcting the alignment of the pelvis to a neutral position because of the exercises that are 90/90 hip lift with balloon which activates hamstrings bilaterally or 90/90 hemibrige with balloon which activates hamstrings unilaterally.

CONCLUSION

This study demonstrates that both the techniques are effective in reducing pain and improving hip range of motion in subjects with positive Ober's test with low back pain. However; on comparison Abdominal and Hamstring Muscle Activation exercises showed better results to alleviate pain and improve functional measures.

Hence the Abdominal and Hamstring Muscle Activation exercises is a better choice of treatment in reducing pain and increasing Hip ROM in subjects with positive ober's test in low bck pain

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