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A study to find the association between Hamstring tightness and Sacroiliac dysfunction and to find the efficacy of met on Hamstring flexibility

***Jyothi.S M.P.T and Gopal swami A.D**

Faculty of Physiotherapy, Sri Ramachandra Institute of Higher Education and Research, Chennai.

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***Corresponding author:**
jyothiseshan@gmail.com

Abstract

Low back pain can cause restricted functional activities in our life. It is the most frequent cause of activity limitation for younger population. Short hamstring muscles are common among subjects with Low back pain as a compensatory mechanism for controlling the excess lumbar lordosis induced by specific patterns of muscle impairments known as "Pelvic Cross Syndrome"(Silvano A. Mior 1997). Sacroiliac strain is the common cause of low back pain and is typically identified by motion restriction and malalignment between left and right innominate bone (Goldwite and Osgood, 1905). Sacroiliac joint dysfunction is a reversible decreased mobility of the joint (Pairs, 1993). **Background and purpose:** Muscular imbalance in hamstring, erector spinae and gluteus maximus is quite common in occurrence. The afore said muscles being a part of vertebral column, pelvis and sacroiliac joint, might have an influence on the segments. Consequently, it might lead to motion restriction .it could also result in shear dysfunction at sacroiliac joint because of locking of innominates in abnormal position. To find out the association between hamstring tightness and sacroiliac dysfunction among subjects with Mechanical Low back pain. To find the efficacy of MET in improving Hamstring Flexibility among subjects with Sacroiliac dysfunction. **Methodology:** 90 subjects were taken to the study and categorized as with Sacroiliac dysfunction (n=70) and without Sacroiliac dysfunction (n=20). Among 70 subjects had Sacroiliac dysfunction with Hamstring tightness had sub-grouped (n = 31) and subjects had Sacroiliac dysfunction without Hamstring tightness (n = 39). All subjects were treated as per their referral modalities. Also, all subjects were questioned as Oswestry Disability Index (ODI). **Results :** The result of the study, based on this statistical analysis, there is an association between hamstring tightness and sacroiliac dysfunction (5.03). It is statistically significant at P <0.01. Also, among 31 subjects had SI dysfunction with hamstring tightness had received MET, after that, there was a drastic difference in Hamstring flexibility to these subjects, (mean= 27.9, SD=10.7) and Confidence Interval (CI= 23.94 (1.93, 31.85). **Conclusion:** There was an association between hamstring tightness and sacroiliac dysfunction. Also, it was found that improvement of hamstring flexibility using MET was drastic and hence significant.

Keywords: Innominate bone; Hamstring tightness; Sacroiliac dysfunction.

INTRODUCTION

Many adult populations experience Low Back pain for about 60% to 80% in their lifetime (Hamill & Knupzen, 2009). It is the most frequent cause of activity limitation for younger people, with a prevalence of 30%, one-year prevalence of 50%, and lifetime prevalence of 80%. Low back pain can cause resisted functional activities in our life. Yet, there continues to be great difficulty in localizing the structure responsible for regeneration of pain in most patients (Gray, 1995).

Short hamstring muscles are common among subjects with Low Back Pain. Some have attributed hamstring tightness among subjects with LBA as a compensatory mechanism for controlling the excess lumbar lordosis induced by specific patterns of muscle impairments known as "Pelvic Cross Syndrome". Also definitive diagnosis of low back pain subjects continues to especially true of Sacroiliac joint, which has a controversial history ranging from being the cause of low back pain to having no role at all in the generation of painful conditions (Silvano A. Mior 1997). Also there has been correlation established between tightness and sacroiliac dysfunction (Michael t. Cibulka, 1986).

"Sacroiliac strain is the common cause of low back pain." In the presence of sacroiliac joint dysfunction is typically identified by two different tests, one that report motion restrictions and other that identifies malalignment between left and right innominate bone (Goldwite and Osgood- 1905). Sacroiliac joint dysfunction generally refers to pain in the sacroiliac joint region that is caused by abnormal motion in the sacroiliac joint. Sacroiliac joint dysfunction is a reversible decreased mobility of the joint, the result of articular cause as a joint dysfunction as a state of altered mechanics, characterized by an increase or decrease from the expected normal or by the presence of an aberrant motion (Paris, 1993).

Reduced flexibility of skeletal muscles has been classically managed by many methods in Physical Therapy among the commonly used methods. Clinically MET proves to be an effective method in alleviating tightness and very few studies were adopted the method as a part of treatment (Puhakka et al 2009). Thus following an establishment of positive correlation between hamstring tightness and sacroiliac dysfunction, MET has been adopted as a method to improve flexibility (Schuenke et al 2006).

Muscle Energy Techniques was described by Fred Mitchell Jnr (1967), he stated MET as "Active muscular relaxation techniques". "Post-isometric relaxation technique creates muscle relaxation that occurs after applying isometric contraction of muscle (Kuchera & Kuchera, 1993). MET works based on "Gate Control Theory", is one mechanism for altered stretch tolerance and pain perception.

During MET procedures, a muscle is often stretched beyond its active ROM, which stimulates the joint mechanoreceptors and proprioceptors, by creating an inhibition of the incoming signals of pain at the dorsal horn of the spinal cord. The force generated during contraction is

detected and categorized as noxious stimuli, which immediately activates the Golgi tendon organs in order to inhibit the force and prevention of injury. The MET protocol, both nociception and inhibition of the Golgi tendon organs are decreased, as the muscles and tendons accustomed to their newly positioned lengths (Etnyre & Adraham 1986).

Thus, the present study is proposed in order to establish the correlation between hamstring tightness and sacroiliac dysfunction, also to find the efficacy of MET for improving hamstring extensibility.

AIM OF THIS STUDY

- The purpose of this study is to correlate between hamstring extensibility and Sacroiliac joint dysfunction among subjects with Mechanical Low back pain.
- Finding the efficacy of MET.

METHODOLOGY

Sample Size

90 subjects

Participation selection

90 subjects with Mechanical Low back pain were screened based on inclusion criteria. Followed by examination for Sacroiliac joint dysfunction provocative test and Hamstring Flexibility & ODI tamil version outcome measure is taken from the subjects. The subjects who have Hamstring tightness will be taken in Experimental Group and Muscle Energy Technique is applied for hamstring extensibility. The subjects who have no Hamstring tightness will be taken in Control Group and Strengthening exercises for surrounding musculature in Sacroiliac joint is taught to the subjects.

Procedure

Sacroiliac joint dysfunction provocative test:

Thigh Thrust test

Position of the subject in supine lying. Then hip flexed to 90 degree. The therapist applies posteriorly directed force through the femur. Positive sign indicates pain over the Sacroiliac region by the subject.

Gillet's test

Position of the subject in erect standing. Followed by the therapist will palpate the PSIS of the subject and ask the subject to weight bearing within one leg (ipsilateral side off the ground). Positive sign, the ipsilateral PSIS fails to move poster inferiorly.

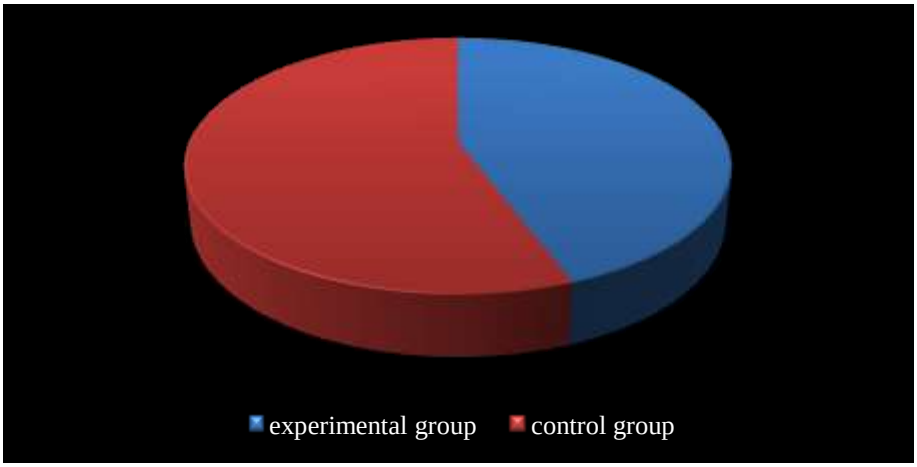
Muscle Energy Technique

Positioning of the subject in supine lying. Followed by the therapist instructs the subject to raise his or her leg without bending the knee. Then, therapist will give the resistance while the subject's leg back to the ground or couch.

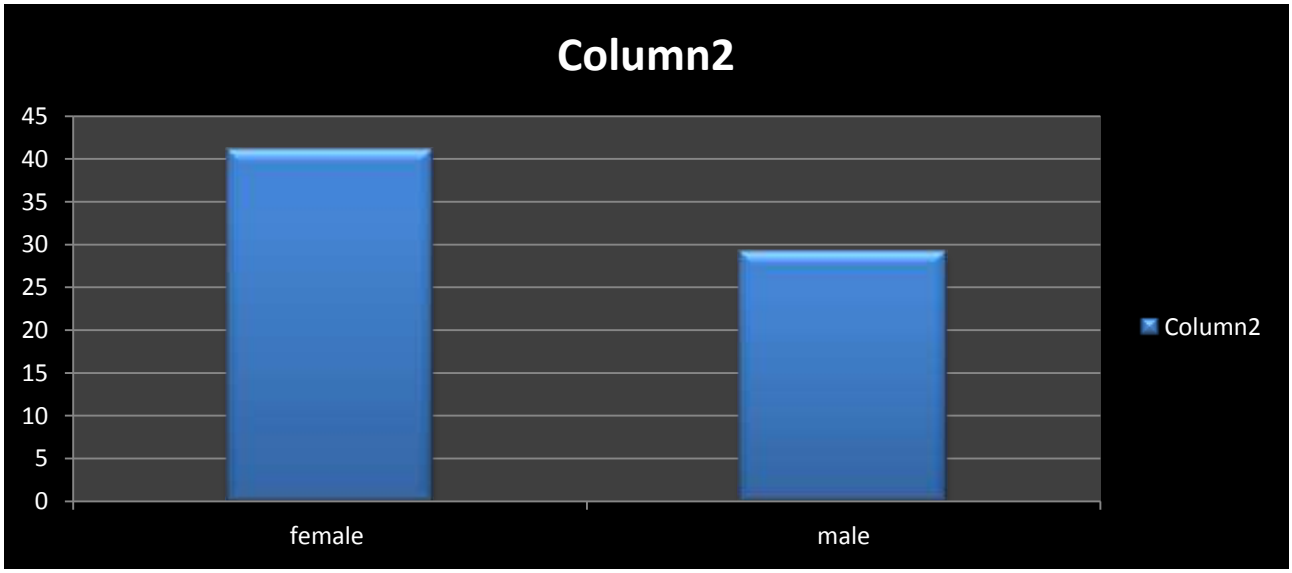
The therapist will ask the subject to hold it for 30 seconds for each repetition. This will be done up to 7 to 10 reps.

RESULTS

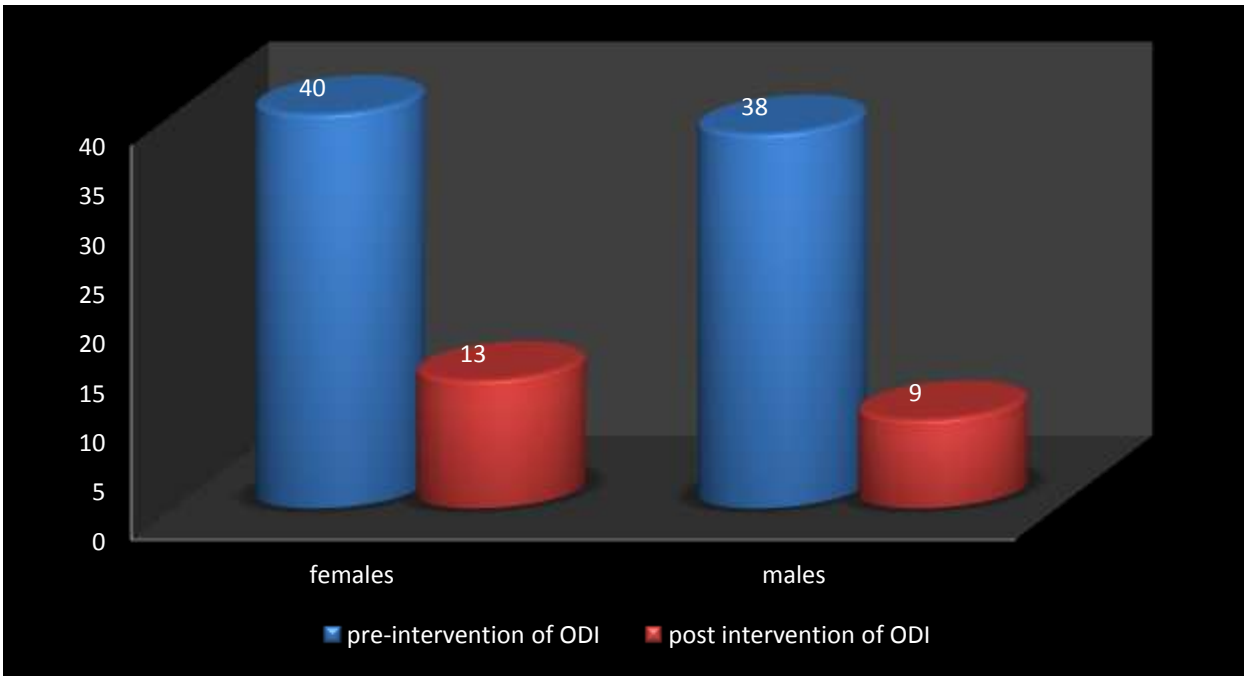
Overall 70 subjects, with sacroiliac joint dysfunction with hamstring tightness were 31 as Experimental group & without hamstring tightness were 39 as Control group. For 70 subjects came for 7 days follow-up. For experimental group, subjects were compared as pre-intervention & post- intervention with Oswestry Disability Index.



Overall 70 subjects- how many females & males are suffering from Sacroiliac dysfunction & hamstring tightness:



Experimental Group: Pre & Post-intervention of ODI for females & males



Male	ODI	Pre	12	38.16667	14.38328	28.58(19.74-37.43)	<0.001
		Post	12	9.583333	3.704011		
Female	ODI	Pre	19	40.84211	12.91538	28.32(23.08-33.55)	<0.001
		Post	19	12.52632	4.891812		

Experimental Group: Pre & Post-intervention of MET for females & males:

In this 31 subjects, the functional measure as ODI in Tamil version was taken and calculated values are, for Pre- intervention (mean = 39.8), based on MCID values -12.8 (2.92 – 15.36) within this range, there was a increased threshold value for Pre-intervention of ODI. Then, for Post-intervention of ODI (mean = 11.3), based on MCID values, there was a changes and also reduced threshold value for Post-intervention of ODI after applying MET for Hamstring flexibility.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Hamstring Tightness (degree)	32.7	31	10.5	1.89
	Post-Hamstring Tightness (degree)	4.83	31	0.89	0.16
Pair 2	Pre-intervention (ODI)	39.8	31	13.3	2.39
	Post-intervention (ODI)	11.3	31	4.63	0.83

Table 3- subjects among SI dysfunction with Hamstring flexibility – before and after applying MET. (Pair 1) – Hamstring flexibility – Pre and Post for MET in degree, (Pair 2) – Pre and Post for ODI – before and after applying MET in percentage.

DISCUSSION

The present study revealed that out of total sample of 90 subjects, statistical analysis revealed that, the proportion of subjects identified with SI dysfunction (n=70) and without SI dysfunction (n=20) is statistically significant (p = 0.198). The result is statistically significant at (P< 0.01). This is in accordance with the study conducted by (Amir Massoud Arab, 2011).Odds ratio and Chi square test were used for analysis. The factor of SI dysfunction associated to Hamstring tightness (n=31), also goes in accordance with the (van Wingerden et al, 1993). Though, there is an association between the two factors, the proportion of population was comparatively same. According to the stated, Hypothesis data revealed that, there is an association between the factors in SI dysfunction and Hamstring tightness.

The second part of the study where in a group of subjects, who were identified to have SI dysfunction with Hamstring tightness were applied MET and the outcome revealed that, improved flexibility of the Muscle. The afore said finding of the present study is favored by the

study by (Massoud et al, 2011). This again proves that MET is useful to alleviate Hamstring flexibility in the effective manner, proving the aim of the present study.

The functional outcome of the subjects (n=31) who had SI dysfunction with Hamstring tightness, was determined using ODI (Tamil version) for the present study, were by (J.I.Vincent, 2004) was adopted. The ODI revealed that, the functional status of the subjects (n=31) had significantly improved by Post- MET. ODI score (mean=11.3, SD=4.6) in percentage. Based upon paired t-test calculation was done.

The MCID for ODI (Copay et al, 2008) considering the threshold value stated in the literature by (Copay et al, 2008), the value obtained in the present study was (mean=11.3). This falls to be within MCID threshold value for ODI. Hence, the outcome may be considered to be significant proving an improvement in the functional status of the patient.

LIMITATION

The prior studies related to Sacroiliac dysfunction had very minimal literature evidence. Also, method of treatment adopted MET in the present study had very minimal literature evidence.

FUTURE SCOPE

The study may be carried out with larger number of samples in future and gender differences of the variables, considered for analysis.

CONCLUSION

There was an association between hamstring tightness and sacroiliac dysfunction. Also, it was found that improvement of hamstring flexibility using MET was drastic and hence significant.

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