

## MYOFASCIAL RELEASE THERAPY IN ADDITION TO THE POSTERIOR PELVIC TILTING IN HYPERLORDOSIS INDIVIDUALS

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### ABSTRAK

#### Key Word:

Myofascial Release  
Therapy,  
Posterior Pelvic  
Tilting,  
Abdominal  
Exercises,  
Flexible Ruler,  
Modified Schobers  
Test

**Abstract:** Hyperlordosis is excessive curvature of lumbar spine, caused by incorrect posture, muscle weakness, obesity and pregnancy. Management for Hyperlordosis was not shown to be effective. The Aim of the study is to identify the effect of myofascial release therapy, posterior pelvic tilting and abdominal exercises in Hyperlordosis. Single blinded randomized controlled trial involves 69 participants who randomly divided into three groups, MFRG is myofascial release therapy group, PPTG is posterior pelvic tilting group & ABEG is abdominal exercise group. Outcomes measured are lordotic angle by Flexible ruler (FR) and Range of motion by Modified Schobers test (MST). Result shows that there was significant difference between the groups. Tukey HSD analysis showed that Q statistics for the FR between MFRG vs PPTG is 13,71 ( $p < 0,01\%$ ) and MST is 20,34 ( $p < 0,01\%$ ), FR between PPTG vs ABEG is 5,16 ( $p < 0,01\%$ ) and MST is 15,35 ( $p < 0,01\%$ ), FR between MFRG vs ABEG is 8,55 ( $p < 0,01\%$ ) and MST is 4,99 ( $p < 0,01\%$ ). PPTG group has showed marked differences when compared with the other two groups (MFRG and ABEG). ABEG also showed significant differences when compared with MFRG. Conclusion of this study was there is a significant difference obtains in the lordotic angle and range of motion in PPTG).

**Abstrak:** Hyperlordosis adalah kelengkungan tulang belakang lumbar yang berlebihan, disebabkan oleh postur tubuh yang salah, kelemahan otot, obesitas, dan kehamilan. Manajemen untuk Hyperlordosis terbukti tidak efektif. Tujuan penelitian ini adalah untuk mengidentifikasi efek terapi pelepasan myofascial, memiringkan panggul posterior dan latihan perut pada Hyperlordosis. Uji coba Single Blinded secara random dan terkontrol melibatkan 69 peserta yang dibagi acak menjadi tiga kelompok, MFRG adalah kelompok terapi pelepasan myofascial, PPTG adalah kelompok miring panggul posterior dan ABEG adalah kelompok latihan perut. Hasil yang diukur adalah sudut lordotik dengan penggaris Fleksibel (FR) dan Rentang gerak dengan tes Modified Schobers (MST). Hasil menunjukkan bahwa ada perbedaan yang signifikan antara kelompok. Analisis Tukey HSD menunjukkan statistik Q untuk FR antara MFRG vs PPTG adalah 13,71 ( $p < 0,01\%$ ) dan MST adalah 20,34 ( $p < 0,01\%$ ), FR antara PPTG vs ABEG adalah 5,16 ( $p < 0,01\%$ ) dan MST adalah 15,35 ( $p < 0,01\%$ ), FR antara MFRG vs ABEG adalah 8,55 ( $p < 0,01\%$ ) dan MST adalah 4,99 ( $p < 0,01\%$ ). Kelompok PPTG menunjukkan perbedaan yang nyata jika dibandingkan dengan dua kelompok lainnya (MFRG dan ABEG). ABEG juga menunjukkan perbedaan yang signifikan jika dibandingkan dengan MFRG. Kesimpulan dari penelitian ini adalah ada perbedaan yang signifikan dalam sudut lordotik dan rentang gerak pada PPTG.

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## INTRODUCTION

Hyperlordosis is defined as an increase in lumbar lordosis. It has been advocated as the major cause of pain in the lower back. Spinal curvatures present since birth, these curves play a role in reducing stress in the vertebra, transfers weight from the head to the ground. Curvatures also helpful to maintain the body erect and position the body well in the space. In lumbar spine lordotic curves are present to bear the body weight well (Levangie & Norkin 2005). Excessive lordosis curvatures of lumbar spine result in pathological changes in the body.

Increase in the lordosis would cause increase stress on the posterior structures (Yoo. et al., 2014). Hyperlordosis may occur due to Poor Posture, Obesity, Pregnancy, Muscle tightness (hip flexor), muscle weakness (abdominals) and trauma. Any adjustment in the lumbar lordotic angle produce more stress on the lumbar spine result in low back pain. (Fatemi et al., 2015).

Increased lumbar lordosis produce modification in the pelvis, there will be an anterior tilting with overstretching of the abdominal muscles, with shortening of the extensor muscles (Alvim et al., 2010). Abdominals and the gluteus muscles are becoming over stretched and the hip flexors and the lumbar extensors are becoming tightened. These produce changes in the lumbosacral angle and compromises the lumbar spine stability.

Measurement of lumbar curvatures was done with radiological findings however there is no accurate tool to measure lumbar curvatures clinically. So, as to measure the lumbar curvatures, one of the best and valid equipment is flexible ruler which helps to identify the amount of lordosis (Seidi et al., 2009). Flexible ruler found that 30°—40° as the normal lumbar curvature angle.

Anything more than 40° is considered as hyperlordosis (Seidiet al., 2009).

Exercises are the common intervention in managing these abnormal curvatures. Corrective exercises were prescribed to reduce the Hyperlordosis as well as the stress in the lumbar spine. All the exercises has plausible biological rationale and low costs and has been recommended in most of the clinical practice guidelines (Yamoto et al., 2015).

Myofascial release therapy is one of the best in reducing tightness in the lower back region. Fascial release techniques which release fascial restrictions in-turn reduce the muscle tightness (Barnes, 2008). It was hypothesized that fascial restriction occurs when fascia reorganize in response to tension. The restriction constricts the tissues which are embedded within the muscles, bones, tendons, and ligaments to protect the body from further damage (O'Connell, 2003).

Posterior pelvic tilting exercises (PPT) have been recommended exercises for the low back pain since 1980s. However it was not extensively studied by the researchers. PPT involves active contraction of the abdominal muscle and associated core muscles (Hubley-Kozey et al., 2002). Since there were no much detailed study on the effect of MFR therapy, PPT and exercises to abdominal muscles this study tries to compare these techniques and aims to identify the role of the same.

## METHODOLOGY:

Single blinded randomized controlled trial conducted with subjects on hyperlordotic postures. Study was approved by the institutional ethical committee, KG Hospital, Coimbatore,

India. Study was conducted in Department of physiotherapy and Out-patient department of Physiotherapy, KG College of physiotherapy, Coimbatore. Notice was displayed in various places of the College campus and the computer companies inside the college campus, individuals with low back pain and having hyperlordosis were separated from the group of volunteers. Blinded evaluator identifies the subjects and also measures the variables. Sample size was determined based on the pilot study done with 15 participants with 5 in each groups. The mean and SDs for the parameters from the pilot study with  $\alpha=0,05$  with 90% power were used to calculate the sample size. From a group of 129 individuals with hyperlordosis, 79 individuals were selected for the study. All the selected subjects were randomly assigned into three groups by a computer generated random allocation. Group of 26 individuals, who receives myofascial release therapy alone called as MFRG, Group of 27 individuals who receives myofascial release therapy along with posterior pelvic tilting exercises termed as (PPTG) and group of 26 individuals receives myofascial release therapy with abdominal exercises termed as (ABEG). Participants selected by the blinded assessor based on the patients with low back pain more than 6 weeks duration, referred by the clinical orthopedician and evaluated by two senior physiotherapist and assessed by blinded assessor, participants includes age group of 35—50 years, working in sitting position for more than 6 hours in a day and more than 30 hours in a week, desk job work for more than 5 years, pain scale on less than 5 in numerical pain rating scale and lumbar lordosis more than  $45^\circ$  measured using flexible ruler. (Rajabi et al., 2007, Mirbagheri et al., 2015). Participants with any radiating pain, psychological problems, spinal deformities, obesity,

current pregnancy, hip flexor tightness and congenital deformities of the lumbar spine, hip or knee are not included. Once the treatment was conducted few of the participants were dropped out from the study due to personal reasons, increase of symptoms and transfer of job. There are 10 participants were withdrawn from the study. This study ended with 23 participants in each group. All the participants were explained completely about the study and informed consent was obtained from all the participants. Study was conducted for 12 weeks of duration. The entire treatment group was instructed by senior physiotherapist who has experience in the manual therapy for more than 5 years. Myofascial release group MFRG receive a set of fascial release technique described by Arun et al.,2014. Techniques included focus stretch of the back extensors, wringing of the back muscles, arm pull, leg pull and gross stretch of the back muscles. Posterior pelvic tilting exercises group, PPTG receive a set of pelvic exercises described by Yoo 2014. The exercises includes abdominals curl ups, prone leg raise, hamstring curls, standing posterior tilting, sitting posterior tilting, abdominal tucking in sitting and standing and crook lying posterior tilting. Frequency is 3 set with 20 repetitions and 3 times a week. (Minicozzi, et al., 2016). ABEG receive a set of myofascial release therapy with abdominal exercises described by Levine et al., 1997. The exercises includes four point pelvic tilting exercises, Supine with leg slides, wall slides in sitting and standing, curl ups and diagonal curl ups. Frequency is 3 set with 20 repetitions and 3 times a week. Outcome measures were evaluated in the study are Lordotic angle which was measured by Flexible ruler, and Range of motion was measured by Modified Schobers test. Both the measurement tools are highly valid tools.

The data's were collected in the first visit of the study, and at the end of the study. All the collected data were analyzed using inferential statistics by SPSS 20.0.

**RESULTS**

Once the data's from the outcome measured were collected by the blinded assessor the statistical analysis were done using SPSS 20.0. The study was done with three groups and the analysis

was done using ANOVA, once the significance was found with 0,05% then post hoc test was used to identify the significance between the groups.

Table 1 presents the descriptive statistics between the groups. All the groups show the same mean in the beginning of the treatment. Post test results would change following application of various treatment measures.

**Table 1.**  
**Demographic variables**

Descriptive Statistics							
Treatment	MFRG		PPTG		ABEG		
	Flexible ruler	Modified Schobers Method	Flexible ruler	Modified Schobers Method	Flexible ruler	Modified Schobers Method	
Number of Participants (N)	23	23	23	23	23	23	
sum $\sum xi$	840,65	77	680,62	183	740,85	103	
mean $\bar{xx}$	36,55	3,35	29,59	7,96	32,21	4,48	
sample variance $s^2$	2,752	1,1462	10,69	0,77	4,34	1,62	
sample std. dev. $ss$	1,66	1,07	3,27	0,88	2,08	1,27	
std. dev. of mean $SE_{\bar{x}}$	0,35	0,22	0,68	0,18	0,43	0,27	

Table 2. presents the ANOVA analysis for the two variables. Post values of the three groups were taken for the analysis, Modified Schobers method show that  $F = 112,4$  which is more than the table value and the probability of this result, assuming the null hypothesis, is less than .0001. Analysis for the flexible ruler analysis is found to be  $F = 47,93$  which is more than the table value and the probability of this result, assuming the null hypothesis, is less than .0001. Anova results are displayed in Table 2. The p-value corresponding to the F-statistic of one-way ANOVA is lower than 0,01 which strongly suggests that

one or more pairs of treatments are significantly different. Tukey HSD, post-hoc tests would likely identify which of the pairs of treatments are significantly different from each other. The results were displayed in Table 3.

**Table 2.**  
**Outcome Analysis**

	Flexible Ruler	Modified Schobers Test
Sum of Squares	391.1	77.91
Mean of Squares	5.93	1.18
DF	2,66	2,66
F Value	47.93	112.4

**Table 3.**  
**Evaluation of Tools**

Treatments	Evaluation	Q statistic	p-value	Inference
MFRG vs PPTG	Flexible ruler	13.71	0.001	** p<0.01
MFRG vs ABEG	for Lumbar	8.55	0.001	** p<0.01
PPTG vs ABEG	lordosis	5.16	0.001	** p<0.01
MFRG vs PPTG	Modified	20.34	0.001	** p<0.01
MFRG vs ABEG	Schobers test	4.99	0.002	** p<0.01
PPTG vs ABEG	for Range of motion (flexion)	15.35	0.001	** p<0.01

Table 3, show that there was significant difference between the groups and the groups of treatment shows marked differences. There was a significant difference in MFR with PPT group (PPTG) when compared to the other groups MFRG & ABEG, where as ABEG shows difference of improvement when compared with MFRG.

#### DISCUSSION:

The aim of the study was to identify the effect of myofascial release therapy in addition to the posterior pelvic tilting on lordotic angle in Hyperlordosis individuals. Participants in this study underwent Myofascial release therapy, Myofascial release therapy with posterior pelvic tilting exercises and Myofascial release therapy with abdominal exercises.

Myofascial release therapy is designed to stretch the fascia and loosens the soft tissues and joint restrictions. MFR would aid in breakdown of the cross linkages in the soft tissues around the joint, it increases the inter fiber distance and increases the extensibility of the tissues (Greenman 2003). Reviews supported that there was a significant improvement in the lumbar range of motion after the application of MFR in patients with chronic low back pain (Fernández-De-Las-Peñas et al., 2005).

Few literatures supports that MFR helps in breaking adhesions by rapidly increasing the blood flow and lymphatic drains which would increases the soft tissue extensibility around the lumbar spine (Paoloni et al.,2009, Saratchandran et al., 2013).

Posterior tilting of the pelvis involves contraction of the abdominal muscles and it also involves strengthening of the abdominal muscles to impart active stiffness to the spine through their attachments to the thoraco lumbar fascia (Hubley-Kozeyet al., 2002). Abdominal tucking would improve the activity of the pelvis which promotes the posterior tilting of the pelvis which would reduce the lumbar lordosis (Vezina et al.,2000). Researchers also suggested that posterior pelvic tilting would help to reduce the lordotic curvatures. Result of the studies have demonstrated that properly trained pelvic tilting maneuver produce voluntary rotation of the pelvis and produce sufficient amount of alteration in the lordotic curvatures (Minicozzi et al., 2016).

When the abdominal muscles become weaker, it allows the pelvis to deviate from the normal alignment which would cause excessive anterior tilting and increase in lumbar lordosis. Strengthening of these abdominal

muscles will bring back the normal biomechanics of the pelvis and the hyperlordosis will be obliterated (Workman et al., 2008). Although abdominal strengthening would provide many benefits it would not cause significant change in the lordotic posture this is because of their occupational factors, life style habits and so on. (Levine et al., 1997).

This study shows that all the three groups have significant improvement in the functions. When comparing between the groups PPTG who underwent myofascial release therapy with posterior pelvic tilting exercises showed much significance than the other groups. ABEG shows a significant improvement when compared with MFRG. This study showed a significant difference between the groups. Although there are few limitations found, the participants are working in the static postures which are difficult to resolve. The participants don't have similar demographic characteristics.

### CONCLUSION:

All the three groups showed a significant improvement on all the outcomes measured from the baseline to post treatment. But when compared between the groups only PPTG group has showed marked difference on improvement rather than the other two groups MFRG and ABEG. ABEG also showed significant differences when compared with MFR alone. So this study concluded that there was a significant difference obtained in the lordotic angle and range of motion in hyperlordosis individuals upon application of myofascial release therapy along with posterior pelvic tilting exercises.

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