IJBPAS, January, 2016, 5(1), Special Issue: 507-522

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

THE EFFECT OF ONE PERIOD OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF) RECEPTORS ONLOWER-CROSSED SYNDROME (LCS)

FATEMEH MORAD POUR TALEB[1], YAHYA SOKHANGOUYI[2], VAHID VALIPOURI[3], SAEED FAGHIHI[4]

[1]Department of Management, Khorramabad Branch, Islamic Azad University, Lorestan, Iran;

Fa_moradpour@yahoo.com

[2]Department of Management, Tehran Branch, Rehabilitation University, Tehran, Iran;

yahya1010@yahoo.com

[3]Department of Management, Khorramabad Branch, Physical Education University, Lorestan, Iran; valiour114@yahoo.com

[4]Department of Management, Kharsegan Branch, Islamic Azad University, Esfahan, Iran;

sochi68@yahoo.com

ABSTRACT

The aim of study was to evaluate the impact of a period of PNF exercises on LCS in girls of 20 to be 25 years old. For this purpose, 20 girls with an average age of 22.15 ± 4.7 from Khorramabad were purposefully selected and randomly divided into two experimental and control groups of 10 people each. Variables include lordosis angle tested using link method, the hip flexor muscle flexibility tested by Thomas Test, right muscle flexibility of the spine tested with Schober Test, abdominal muscle strength tested by sit-ups and using Dubletraight leg lowering, and gluteal muscle strength was tested and analyzed using Daniels test. Training (holding, relaxation and repeated contraction techniques) was considered for six weeks, three sessions per week and 60 minutes per person. Then the variables were tested again. Results of the research were analyzed using independent T-test and Mann-Whitney U test to compare parametric and nonparametric data with 95% of confidence with spss version 19. The statistical results obtained from the comparison of the two groups showed that in all tests, significance

levels are obtained as sig<05%, so corrective PNF exercises can be effective in curing girls with LCS.

Keywords: Proprioception, PNF, lower cross syndrome.

1. INTRODUCTION

Much research in the field of fitness and skeletal abnormalities has been conducted in Iran all of which indicate a high prevalence rate of backbone disorders (Gharakhanlou-1989). Body condition or posture in human refers to relative position of body parts in order to perform a specific activity. The meaning of physical condition is a fixed unit of static and dynamic structure and the body in different situations such as sitting, standing, and walking (Daneshmandi and others-2007). Many factors such as fatigue, illness, mental states, habits, culture and race play a role in drawing physical status (Farahani- 2004). According to research, it is found that of the main causes of anomalies is position and muscle imbalance caused by factors called motion poverty or lack of variety of motions. Muscle imbalance is defined as a change in the functional relationship between pairs or groups of muscles. Muscle imbalance is a condition in which there is only a little balance between certain types of muscle. Apparently, this deviation is somewhat systematic. It seems that some of the muscles tend to shorten (tightness), and others are likely to get long or weaken (inhibit). Deviations from straight and vertical structural conditions are seen in the compensatory movement patterns. Something does not work as the body needs, so the body asks other muscles or structures to enter and help (advantage of partner muscle). Many structures and muscle groups have very definite functional roles in the body, although they can properly be used in the production of more than one movement. Interestingly, the body tends to create specific patterns among muscles to compensate the situation. Janda studied such patterns in the early 1970s. One of two parts that most disorders of muscle imbalance occur there or start from is pelvis-thigh area. LCS is a condition characterized by abnormal anterior tilt of the pelvis and lower body muscle imbalances (Ay Clarke and Lucette- 2011). LCS is identified by rigidity and shortness of hip flexor muscles, gluteal muscles, muscles of the posterior spinal and abdominal muscle weakness. This muscle imbalance has detrimental effects on the static and dynamic state of the body, particularly while walking. This syndrome causes anterior pelvic tilt, lumbar lordosis increase and little bending of hip joints

(Alizadeh and Qitasy-2012). LCS is as a model of muscle imbalance in which the kinetic chain is lower that influences waist-pelvis-thigh- knee and ankle set. This syndrome can happen in people who sit for long periods or continuously over a period of time and the ones who have had motion poverty. Velademirjanda, in a study as muscle imbalance, knows the reason of LCS as overactive muscles of the back side, right femoral, iliac as well as mutual weakness of the abdominal and gluteal muscles (Ay Clarke and Lucette-2011). In LCS, some muscles are overactive and therefore, become short, stretching exercises can have a beneficial effect on the syndrome. There are many ways to do stretching and all stretching designed with specific techniques are available today in many books. In the past 15 years, facilitation of PNF has widely been popular, especially among athletes. Facilitation of PNF is a therapeutic method created in the late 1940s and early 1950s by Herman Kabat and two physiotherapist called Maggie Knott and Dorothy Voss. PNF stretching is not only one aspect of the PNF, but also a very effective and complex physical therapy technique (Barati and Eshraghi- 2008).

2. REVIEW OF LITERATURE

The results of studies have shown that PNF Stretching, due to engaging the proprioceptive receptors, has better effects on muscle flexibility, joint range of motion, though in some other studies, the results are reverse and some others have shown the same effect compared to other techniques in improving muscle flexibility. Research has shown that abdominal and thigh muscles as a pair force affecting pelvic causing posterior pelvic rotation and loss of lumbar lordosis. However, another research has seen strengthening the abdominal and hip extensor muscles as ineffective in pelvis turning and has rejected this theory. In this regard, in their investigations, many researchers have tried to confirm or refute this issue, and contradictory results have been obtained. Taghizadeh Naderi in a study investigated the association between abdominal muscles of the lumbar lordosis, in athletes and non-athletes. In the end, despite higher levels of power in the abdominal muscles in athletes group no significant difference in the two groups of lumbar lordosis. In addition, no significant association was observed between abdominal muscles and the lumbar lordosis in both groups (Taghizadeh Naderi- 1998). Chubineh conducted a study similar to Taghizadeh Naderi, on 20 healthy men with an average age of 12.5 ± 1.67. He did not

find a significant relationship between abdominal muscles and the lumbar lordosis at the end (Seidii and others- 2007). Walker examined the relationship between lordosis, rotation of the pelvis and abdominal muscle strength and performed numerous measurements on 31 healthy adults aged 32-20 years. Using the flexible ruler, inclinometer, and the test of Dubletraight leg lowering studied, he calculated lordosis, pelvis rotation, and abdominal muscle strength, respectively. Results showed that there was no significant relationship between these variables. Heino also studied the relationship between the range of motion of the hip and lordosis, rotation of the pelvis and abdominal muscles. He used 25 healthy adults (10 men and 15 women) aged 21 to 49 years. At the end, he did not find a statistically connection between the lordosis, rotation of the pelvis and abdominal muscle strength. Moore examined the relationship between lordosis, pelvic rotation, and hip opening in 19 healthy subjects and 19 patients with chronic low back pain, and did not find a significant association between any of the variables. Levine studied the effect of strengthening the abdominal muscles on lordosis and pelvic tilt in 40 healthy 18 to 35 year old students (8 men, 32 women). The results showed that despite a significant increase in abdominal muscle strength after 8 weeks of exercise in the experimental group, no changes happened in the lordosis and pelvic tilt of this group. In addition, before and after the exercises, there was no significant difference between control and experimental groups in the lordosis and pelvic tilt (Daneshmandi and others-2006). But Alizadeh in research titled “The result of a training program on the subject with lumbar lordosis” applied corrective exercises to flex the muscles of the lumbar and hip flexor muscles and also strengthening exercises for abdominal muscles and hip extensor muscles. After 4 weeks, the results showed a significant difference in the experimental group before and after lumbar lordosis corrective exercises (Chubineh-2001). Rahimi, in a study entitled “Studying the effect of corrective exercise on lumbar lordosis of girls with lumbar lordosis” acted out 8-week corrective exercises aimed at strengthening the flexibility of the hip flexor extensor muscles in the lumbar and abdominal muscles and hip extensor. At the end, a significant difference between the results of pre and post-test was shown in reducing the lumber lordosis (Alizadeh et al-2001). In the same year, a scientist investigated the effect of strengthening the abdominal and hip extensor muscles on

lordosis. According to the results of this study, after 8 weeks of exercise a significant difference emerged in abdominal muscles and hip extensor and subsequently lumbar lordosis, between the experimental and control groups, so that in the experimental group, the muscle strength increased and lordosis decreased (Negahbaani, Sivaki, et al- 2001). Meyer also used hip flexor stretching and strengthening exercises of flexor muscles of the pelvis and lumbar spine muscles for four weeks (three sessions per week, each time for 30 seconds), and the results showed a significant decrease in lumbar lordosis. Sinski sees the strength of waist muscle in direct relation to lordosis. Arshadi also reported a relationship (Naseri- 2005). Kendall, Cailliet, Jull and Kinser believed that the abdominal muscles in the anterior and thigh muscles in the posterior comprise a pair of power on the hip joint whose contraction will lead to posterior pelvic rotation and reduce lumbar lordosis. As a result, weakness in these muscles can cause pelvic anterior tilt and increase lumbar lordosis (Daneshmandi and others- 2006). Research has also determined the effect of PNF exercise on muscle disorders. Zoalaketaf in his study with the purpose to compare the effects of static stretching and PNF, with a review of the validity of sit and reach test, performed three types of practice, namely stop-release, contraction-release stop-contraction and release on the flexibility of hamstring. The results showed that all stretching techniques had similar effects on hamstring flexibility. Therefore, preference criteria for one over the other should be person's interests and progress (Rahimi and Hasan Pour- 2006). Letafatkar conducted research titled as “The effect of dynamic stretching and two different PNF ways on the flexibility of the hamstring and lordosis angle. The results showed that the effect of different stretching on the hamstring muscle flexibility was not statistically significant and partly the effects were the same. According to the results, it can be concluded that all three ways act just the same in increasing the flexibility. In addition, active and passive knee extension, and the lumbar lordosis after treatment with all three of the aforementioned methods increased (Daneshmand and others- 2005). Sady et al in research called dynamic static and PNF flexibility exercises studied and compared the effects of stretching techniques on the shoulder muscles, torso, and legs. The results show the development of the range of motion and flexibility of the hamstring muscles more than in the torso. In two separate studies, Prentice Ringle and Knortz assessed and

compared the effectiveness of different techniques for stretching out. Due to neurophysiology principles, PNF technique is a useful technique in the development of sports skills, increasing flexibility and preventing injuries from muscle strain and tear (Mahdavinejad and Mashhadi, under publication). In a study, Wilfred and Smith investigated the effects of static stretching and PNF (HR) on the joint's range of motion. The results of the pre-test and post-test revealed a significant increase in range of motion in both groups, and no significant difference was observed between static stretching and PNF methods in increasing the range of motion (Mahdavinejad and Mashhadi, under publication).

3. METHODOLOGY

In this study, 20 girls with LCS and average age of 51.22±4.7, weight 16.06 ± 7.18 kg and height of 51.061± 7.35 cm took part. The subjects had no history of spine surgery and pain in the lumbar region. To measure the arc of the lumbar spine, while subjects naked in the upper part were standing quite comfortable and natural. Norland vertebrae L1 and S2 were identified. At first the upper posterior iliac Norland two dents on both sides that match the skin were touched in the lower back and then the two lower sides were connected the and the middle point of the line on Norland vertebrae S2 was marked with marker. By touching the iliac crest on both sides of the hip, fourth lumbar vertebral spine was identified and by counting vertebral spine upwards, the first lumbar vertebra was marked. Placing a flexible ruler, made in Iran, on the lumbar lordosis, it was matched to the curvature of the spine. Then the obtained shape on the ruler was drawn on paper with accuracy and by using the formula $\theta=4\arctan 2H/L4$ the curvature of the lumbar lordosis was determined where L is the length of curve matching L1 and S2, and H is the highest perpendicular to L (Alizadeh et al- 2001). To determine the degree of flexibility of the muscles of the lower back bending forward from the waist test was used. At first, subjects were normally standing, then two bone level of the waist called dimple of nurse, which is congruous with the second sacral vertebra (S2) was marked and using meter 10 cm above the point was marked . After determining the two intended points, the subjects were asked to bend forward without bending knees from the standing position (Figure 1). When the subjects reached the end of their range of motion, the distance between the two marks was measured again. The difference obtained showed the flexibility of the muscles of the lumbar region (Arshadi-2006). In this study,

differences obtained from the bent and standing positions was less than 5 cm that was considered as lumbar muscle tightness (Florence Kendall et al- 2010).

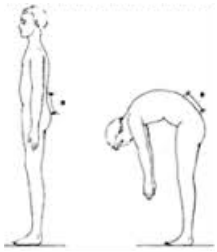

Figure 1 Schober test

To measure the flexibility of the hip flexor muscles, Thomas Test was used, in this way that the person sits at the end of the bed so that the thighs and knees are on the bed and the knees are lower and out of bed. Then the person catches his thighs and brings one of his knees closer to the chest just enough to straight the sacrum and lumbar lordosis. The other knee is right on the edge of the bed so that one can freely bend the knee, and whole hip is also placed on the bed. Due to single and double joint muscles involved, several modes happen in this test (Zolaketaf Vakbari- 2004). In this study, while the lumbar and sacrum flat are on the bed, the separation of the posterior thigh flat was considered as muscle shortness Suez iliac (single-joint thigh flexor) and if the knee is more than 100 degrees, it is considered as rectus femoris shortness (double-joint hip flexor) was considered (Letafatkar et al- 2009). Scoring in this test was that if the Suez pelvic muscle was short, score 1, if the rectus femoris muscle was short, score 2, if both were short, score 3 and in the case of normal length of both muscles, they were given zero as codes

It is used to assess the length of hamstring muscles that play a role in flexing the hip and knee straightening. There is a change in leg lifting test: waist, hip and knee joint. Knee joint is controlled by being located in the extension. The waist and pelvis are controlled with the sacrum and lower back flat on the bed. Person sleeps on his back and extends legs straight away, so that the back and sacrum are flat on the bed. If due to a hip flexor muscle shortness, lumbar region is not placed on the bed, a pillow or rolled towel is put under the knees just enough to look hip and lumbar area lie straight without arc on the bed. While the sacrum and lower back are flat on the bed and one foot is pressed down, lift the other organs with straight knee, the ankle is also free (Figure 2). SLR test shows the actual length of the hamstring muscles while the back is straight. In this case, bending the knee to the hip at an angle of about 82 degrees to the bed is possible (Letafatkar et al- 2009). In this study, the approximate angle of 80 degrees as normal flexibility and less than 70 is considered as short (Ay Clarke and Lucette-2011). Sit-up

test and Dubletraight leg lowering (Kendall's method) to measure abdominal muscles: while subjects were supine on the bed and there was a little padding below the knee with hands stretched along the body, they tried to pull out of bed until removing shoulders from the bed (Figure 3), they did sit-ups for 60 seconds, the number of sit-ups began. In this study, less than 20 moves right in 60 seconds was considered as weakness of the upper abdomen.

Figure 3 sit-ups test

In Dubletraight leg lowering, at first subjects were supine while their hands were on his chest, then subjects bent legs 90 degrees perpendicular to the body. Afterwards the subjects lowered their feet to bed surface slowly in six stages (Figure 4). The participants were told to do every effort not to let their lack lumbar region get distant from the bed while lowering legs. Meanwhile, the first experimenter to the left of subjects, measured the feet move angle by Universal Goniometer made in Germany. So that the movable arm of the goniometer is on the thighs and torso, and the fixed arm is parallel to the body and bed surface. The other examiner to the right of the subject put his eyes on the bed level and was careful to see when the subjects' waist distanced from the bed. By back's distancing from the bed and the second examiner's signaling, the first examiner stopped goniometer, though the subjects continued their movements until the end of the test (Seidi et al- 2007). Each subject took the test twice with an interval of one minute and the better angle gotten, which represented more strength was considered as the maximum eccentric power of abs. In this study, if the subject could, at an angle of 15 degrees from the horizon, without lumbar lordosis (anterior pelvic tilt) keep the leg, it was as normal strength and at more angles to the horizon, other levels of strength were considered (Letafatkar et al- 2009). Scoring the lower abdominal muscle strength was coded in six different degrees.

Table (1) Encoding Thomas test results in spss19			
Both muscles shortness	**Suez iliac shortness**	**Rectus femoris shortness**	**Normal (normal length)**
0	**1**	**2**	**3**

Table (2) How to encode test results of Dubletraight leg lowering in spss19					
Fair	**Fair+**	**Good -**	**Good**	**Good+**	**Normal**
1	**2**	**3**	**4**	**5**	**6**
90 degrees	**75 degrees**	**60 degrees**	**45 degrees**	**30 degrees**	**15 degrees**

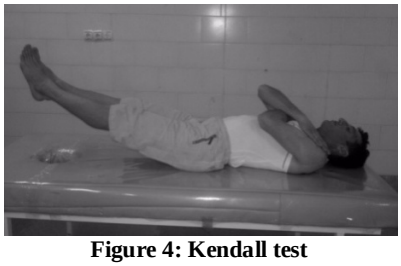

Figure 4: Kendall test

To assess the large gluteal muscle strength, the person is placed prone on the bed. The leg of the subject in the form of the knee bent slightly is kept in adduction form. The examiner puts one hand on the back of the thigh and the other above the pelvis and stops the opening leg by the examiner and applies resistance (Figure 5), and based on manual muscle testing tests (MMT) muscle strength is graded. In this study, gluteal muscle strength was measured using Daniel Test with Kendall's method on a scale of 0 to 5. {0: No contraction 1: contraction observed without joint movement 2: weak, exercising in the full range by the removal of gravity 3: fairly well, exercising the full range against gravity 4: Good, exercising the full range against gravity against average resistance, 5: natural, full range of motion against gravity in the maximum resistance } (Alizadeh and Gheitaasi- 2012). Full range of motion in this test is considered as 15 degrees hip extension.

At first, pre-test was given to two groups with anomaly (experimental group and control group), and then the experimental group received special corrective exercises based on PNF. The exercises were done at the corrective exercises center of Khorramabad for 6 weeks, three sessions per week and for each person a special time was considered. Average time for every was 1 hour: 10 minutes of brisk walking as general warm-up for beginning and 5 minutes slow walking to cool. During the training protocol, change in the number of repetitions and sets as well as overload with 250 and 500 grams were considered for effective weight training, flexibility and strengthening exercises.

Table (3) How to encode Daniels test results in spss19

Zero	Trace	Poor	Fair	Good	Normal
0	1	2	3	4	5

Figure 5: Daniel test

Holding-relaxation corrective exercises to improve flexibility of short tight muscles including the Suez pelvis, spine and right rectus femoris (Figures 5, 6 and 7).1. 6-second isometric

2. Stretching muscle more than 10 seconds.

Corrective exercises to improve weakened muscle strength including abdominal and gluteal muscles Figures (9 and 10) were repeated contractions techniques.

1. Fast stretch

2. Repeated contractions

Figure 6 Suez pelvic muscle tension Hold-Relax

Figure 7 Rectus femoris muscle tension Hold-Relax

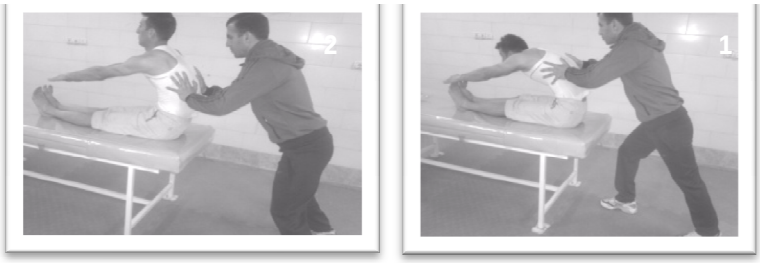

Figure 8 Stretching of the lumbar spine H Hold-Relax

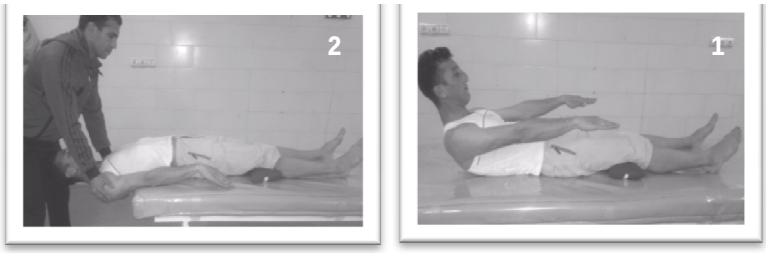

Figure 9 strengthening the abdominal muscles by Repeated contraction

Figure 10 Strengthening large gluteal muscles by repeated contraction

4. Analyses[1]

Table (4): The results of T-test of post-test of parametric data in control and experiment groups

	Mean difference	SD	T	Degree of freedom	Sig
Upper abdominal muscles	28.20	3.70	7.60	18	0.000
Lumbar muscle	3.03	.1955	15.49	18	0.000
Lordosis angle	-6.24	3.51	5.61	18	0.000

Table (5) Results of the nonparametric Mann-Whitney test of post-test data between experiment and control groups

Significance level	Z	The hip flexor muscle flexibility (control)	The hip flexor muscle flexibility (control)	The hip flexor muscle flexibility (test)
0.000	**3.831-**	**5.80**	**5.80**	**15:20**
0.000	**3.827-**	**5.85**	**5.85**	**15:15**
		The gluteal muscle power (control)	**The gluteal muscle power (control)**	**The gluteal muscle strength (test)**
0.000	**3.52-**	**6.10**	**6.10**	**14.90**
0.003	**3.08-**	**6.75**	**6.75**	**14:25**
		The muscles of the lower abdomen (control)	**The muscles of the lower abdomen (control)**	**The lower abdominal muscle strength (test)**
0.000	**3.647-**	**5.95**	**5.95**	**15:05**

[1]The statistical data analysis was done by software spps version 19.

DISCUSSION AND CONCLUSION

The aim of this study was to investigate the effect of PNF exercise on lower cross syndrome. In reviewing the pretest of the statistical hypotheses of musculoskeletal disorders in the lower cross syndrome in two groups (control and experiment), there was no significant difference between the two groups, which suggested that the two groups suffered lower cross syndrome. Furthermore, in checking the pre-test of the hypothetical factors of lordosis angles more than normal in lower cross syndrome disorder (in both experimental and control groups) there found no significant difference between the two groups, indicating that both groups have increased lordosis, which could cause muscle imbalance in the power and flexibility of the muscles of the pelvic stabilization. Lower cross syndrome is recognized by tightness and shortness of hip flexor muscles, the muscles of the spine and posterior rectus muscle weakness and large gluteal muscles. Motion of the pelvis on the hips on the anterior-posterior joints (anterior or posterior tilt) is due to a combined action of muscles as pair power on both sides of the anterior and posterior pelvis. Overall, four main groups of muscles stand against each other in the anterior and posterior pelvic, which brings about stability or move in the hip on thigh joints. 1. The muscles keeping spine straight, lumbar square muscle and other muscles attached to the posterior pelvis exerting upward force to the pelvis, 2- anterior abdominal muscles, particularly the rectus abdominis and external oblique muscle attached to Pelvic girdle and the anterior iliac crest connection exerting upward force to the large gluteal and hamstring muscles of the anterior pelvis, 3- gluteal muscles and the large hamstrings that connect to the posterior pelvis, sacrum, sciatic area, and the posterior and exert a force downward, 4- hip flexor muscles, including the rectus femoris sartorius and fatal flattened pods, and due to being connected to the upper and lower anterior iliac spines and pelvic muscles of Suez and connection to the inner surface of the lumbar spine and the iliac crest, which exert a downward force on the anterior part of the pelvis (Alizadeh and Ghettasi- 2012). The situation created in this syndrome changes the transmission of forces in both lumbar and pelvic When the balance of power in maintaining the stability of two pairs of anterior pelvic tilt is shattered, that is the pair (lumbar and hip flexor muscles) and posterior pelvic tilt to the pair (abs and hip extensor muscles) due to an over activity gets short, resulting in more and more work, and in anterior pelvic tilt and lumbar vertebrae,

we will have a compensatory increase. So, if anterior hip, hip flexors muscles stay in a shorter distance due to tightness, and abdominal muscles are in the longer length due to weakness, lowering force of the anterior hip force will act stronger and reduce angular distance of spine and hip. Of the results of research was the increase in flexibility of extensor muscles of the hip and spine flexor muscles (Sig 01%). The result "increasing in the flexibility of the hip flexor muscles" is consistent with the findings of Rahimi (2009), Kendall (1993), Molzfj (1996), and is not consistent with the findings of Alizadeh, (2001) and Tommy Taylor, (1976), who considered the lack of upgrading of flexibility due to the possibility of measurement error of using Thomas Test and stated this test did not provide the correct information about muscle shortness and the other possibility that at the time of doing sit-up exercise because of the 45 degrees of hip flexion and fixation of the feet to raise the activity of the muscles made stretching exercises ineffective. Possible causes of muscle improvement could be the effect of the hip flexor muscle flexibility exercises, strength training effects of large gluteal muscles, improvement of abdominal muscle strength and the proper functioning of the hip flexor. Moreover, the result of increase in the flexibility of lumbar extensor muscles is consistent with the findings of Rahimi (2009) and Kendall (1993) and not consistent with the findings of Alizadeh, (2001) Kisner C,colby La (1996) who did not see the shortness of these muscles in their study samples because the subjects were students sitting consecutive hours to do the job requirements that lumbar spine was stretched and the potential to promote flexibility in this area than in other sectors declined. Possible causes of improvement in muscle could be due to strengthening the abdominal muscles, improvement in intra-abdominal pressure, improvement in the flexibility of lumbar muscles, gluteal muscles and the proper functioning of the proprioceptive muscles. In explaining the increased flexibility and short stiff muscles with PNF exercises, it can be noted, as Golgi tendon organ is sensitive to contraction, during the maximum isometric contraction of muscle, tension generated by the contraction may stimulate the Golgi tendon organ and create an inverse stretch reflex (autogenic). This reflection prevents the activity of motor neurons and acts as a reflex loose. The evidence provided expresses a degree of flexibility with the help of keep-relax method of PNF techniques, to which the results of this study also refer. With the weakness of the abdominal muscles,

these muscles lose their duty of pulling up the pelvic muscles and give an opportunity for tilt anterior to the pelvis. Of the other results of this research are increase in abdominal muscle strength (Sig 01%) and large gluteal muscles (Sig05%). The finding of increasing the strength of the abdominal muscles is consistent with the findings of Alizadeh, (2001) Daneshmand, (2005) and Seidi, (2007). Possible causes of improved muscle could be; the potential to increase in strength in these muscles, specific exercises to strengthen the abdominal muscles, improved intra-abdominal pressure and improved muscle proprioception. The strength increase of large gluteal muscles is consistent with the findings of Seidi, (2007) Kapanji, (1985) and Norris (1998). Possible causes of the improvement of muscle could be the improvement of range of motion of the hip, the effect of strength training on gluteal muscle, muscle function in a new range and improvement in the proprioception region. In explaining the strength of the weakened muscle with exercise of PNF kind, it can be said that; if the muscle is under tension and in the stretched position, the middle part of the muscle gets under tension, so the stretch receptors are stimulated and send messages to the spinal cord. The fiber afferent neurons in the gray matter of the spinal cord motor nerve that takes messages to and causes contraction of skeletal muscle to become synapse. That is why every time that muscle is under tension gives a contractile response reflectively. In repeated contractions technique, since from the beginning of the run, fast twitch is applied over the muscle spindles, the change applied and because of length change, CNS gives a contractile response and better conditions are provided for the implementation of stronger repetitive contractions. So the evidence somewhat proves the increase in strength by repetitive contraction methods of PNF techniques, the results that this study also refers to. Tightening and shortening of the muscles of the lumbar region due to too much activity can increase the pressure on the posterior lumbar spine and cause extension over the area. Of the other results obtained in the study are decreased lumbar lordosis (Sig 01%) using PNF exercises that is consistent with the findings of Kailinit (1995) Joel (1987) Kisner, (2002) and Daneshmandi (2005), and not consistent with the findings of Walker, (1987), Hino, (1990), Moore (1992), Levin (1997) Chubineh, (2001) and Seidi (2007), who only studied the muscles of the abdominal and hip extensor in changes in lordosis. The possible reason of reducing the increased angle in the lumbar spine can

be due to the use of PNF exercises with hold-relax techniques to increase the flexibility of tightened muscles, flexors and hip muscles lumbar, and repetitive contractions techniques to increase the weakened muscle strength, improving abdominal muscle strength, improving intra-abdominal pressure abdominal, improvement of large gluteal muscles, fitting of proprioception and improvement in muscular balance through the middle part of the body's proprioceptive receptors.

RECOMMENDATIONS

It seems that interoperability of lumbar - pelvic muscles and balance between them determined the extent of lumbar lordosis deviation and not the strength or weakness of the muscles or the flexibility of each alone. It is recommended to evaluate all the factors involved in the musculoskeletal abnormality deviations of the spine in changing situations and to pay great attention to normalization of proprioception in the design of corrective programs that is Janda's idea is the first step in the program to establish a muscular balance.

REFERENCES

1. A Clarke, Michael, C. Lucette, Scott (2011). Basic education corrective exercises. Translation by Alizadeh, Mohammad Hossein, Mir Karimi Pour, SH, Fallah Mohammadi, Mohammad. Tehran: Hatmi Publications
2. Alizadeh, M H, Bayat, MR, Andam, R. (2001). Comparing deep back in male volleyball and soccer city anymore. Journal of Sports Science, No. 1.
3. Alizadeh, MH, Gheitasi, M. (2012). Fundamental concepts corrective actions. Tehran: the Institute of Physical Education and Sport Sciences, First Edition
4. Barati, AJ, Eshraghi, A (2008). Facilitated Stretch. Tehran: the Shahid Rajaee Teacher Training University, First Edition
5. Chubineh, S. (2001). The relationship between abdominal muscles and muscles stretching Suez pelvis with lumbar lordosis. Master's thesis, Tehran University
6. Daneshmandi, H, Alizadeh MH, Gharakhanlou, R (2007). Corrective Exercises. Tehran: Physical Education Center, Sixth Edition
7. Daneshmandi, H. Atri, E. Ghasemi SA. (2006). Comparison of two methods of static stretching and PNF on range of motion below the knee amputee athletes. Research in

Research in Sport Science. No 5, 73-57

8. Farahani, A. (2004). Corrective Exercises . Tehran: PNU, Second Edition
9. Gharakhanlou, R. (1989). The study of the causes of spinal abnormalities and corrective suggestions and motor. Master' Thesis, Tarbiat Modarres University, Tehran
10. Kendall Florence Peterson Kendall Mac carrier Elizabeth, Jace Provence, Patricia (2010). Review and evaluation of the performance of muscles (postural pain). Translation by Haj Ali Reza Ghanbari Bahareh Haaj. Tehran: Sarmadi Publications, Fourth Edition
11. Mahdavinejad, R, Mashhadi, M. (under publication) Advanced corrective actions (general and specialized foundations).
12. MolzFJ,krikpatrikJS,prtinJE,bidez MW(1996).effect of kyphosis and lordosis on the remaining lumbar vertebral levels within a thoracolumbar fusion: an experimental study of the multisegmental human spine. J south orthopassoc 8 (4)261-8
13. Naseri, N. (2005) . Phisiotherapy on Orthopedic injuries (assessment, diagnosis and treatment). Tehran: Sobhe Saadat Publications. second edition
14. Negahbaani Sivaki, H. Abrahami, I and Shaterzadeh, MJ (2001). Evaluation and treatment of lumbar - pelvic. Tehran: Danesh Farayar Publications
15. Seidi, Fouad al-Rajabi, R, Takamjany E, Ismail, Jadidian, A. (2007). The relationship between extensor muscles of the abdomen and the lumbar lordosis. Olympic Quarterly XVI, No. 3
16. Taghizadeh, N, Afsaneh (1998). Review and Comparison of abdominal strength and the curvature of the lumbar spine athlete and non-athlete students. Master's thesis, Tehran University
17. TwomeyLT,taylor JR.(1997).Lumbar posture movment and mechanice in twomry 1 thed .physical therapy of the low back 2 nd ed. Churchill livingstone pp:57-92 22.