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EFFECT OF 8 WEEKS ELECTED COMBINED EXERCISES ON THE LUMBAR LORDOSIS ANGLE, PAIN AND QUALITY OF LIFE OF FEMALES WITH SCIATICA

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ABSTRACT

Chronic low back pain is a prevalent pain generated due to incorrect working, incorrect body posture and mental stresses. Different non-surgical approaches are advised to reduce pain, preserve mobility and minimize disability. The main aim of this study was to determine the effect of 8 weeks combined exercises on the lumbar lordosis angle, pain and the quality of life in females with sciatica. A total number of 15 females aged from 30 to 50 with sciatica and lumbar lordosis included in the study in a targeted manner. Lumbar lordosis angle (flexible rule), pain (McGill's questionnaire) and the quality of life (SF36 questionnaire) of the cases were investigated before and after performing elected exercises for 8 weeks. Data was analyzed using dependent t-test (P<0.05). There was a significant difference in lumbar lordosis angle before (43.0±0.1) and after (34±0.8) the exercises (P<0.05). There was a significant difference in the sensory perception of pain before (2.6±0.8) and after (1.8±0.5) the exercises (P<0.05). There was a significant difference in the emotional perception of pain before (1.4±0.2) and after (1.0±0.3) the exercises (P<0.05). There was a significant difference in different and diverse pains before (2.2±0.6) and after (1.8±0.5) the exercises (P<0.05). There was a significant difference in the physical life of the cases before (1.4±0.3) and after (1.8±0.5) the exercises (P<0.05). There was a significant difference in the quality of mental life of the cases before (2.8±0.02) and after (2.9±0.75) the exercises (P<0.05). It can be concluded that hydrotherapy exercises combined with dry land exercises can improve the lumbar lordosis, pain and quality of life of cases with sciatica. Therefore, it can be recommended as a sciatica-specific modality.

Keywords: *Hydrotherapy, Kinesiotherapy, Lordosis, Pain, Quality of Life, Sciatica, Walking.*

INTRODUCTION

Low back pain is the first cause of disability in people aged <45, is the second cause of referring to physician (Hides et al., 1996) and is the third cause of surgery (Fordyce, 2005). It is the most prevalent musculoskeletal disorder so that a considerable portion of employed people suffer it. About 1/3 of patients referring to orthopedic clinics suffer low back pain induced by non-specialized disorders. They experience pain between vertebra L12 and gluteal fold and refer to their family doctor with more than 3 months' pain without any pathological symptoms (Kesiktas et al., 2004). Low back pain-related damages are the most prevalent damages (60% to 80%). In addition to the health dimensions, they have attracted attention due to economic issues (Farahpour, ESFahani, 2007). A low back pain may be generated due to different causes. It seems that the main cause of low back pain is lifting heavy things which in turn damages joints or soft tissues. Such damages, generally, weaken bone structure, reduce flexibility, change muscular power and reduce physical power. By aging, the damages become more prevalent. However, some other factors such as repeated strikes, skeletal abnormalities (lordosis and kyphosis), as well as non-mechanical factors such as metabolic diseases and pathological infectious and

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neurological lesions have been pointed out as the cause of low back pain (Geiasi et al., 2007). Sciatica is the main cause of low back and feet pain so that its prevalence in industrial societies has been reported to be 40%. Intervertebral disc herniation is the main cause of sciatica. However, it is a symptom rather a disease (Marshal et al., 1977). Researchers have shown that physical activities of standard sports increase cardiac output by 15 times compared to the rate of standard level and increase blood flow in active tissue. This, in turn, mitigates pain and facilitates the relief of relevant organs injury (Van Der Velde, Mierau, 2000). Patients with sciatica suffer low back lordosis in general. Studies on this disorder, including the study of Ghaderi et al (2003), indicated that current and inactive neural relations are strengthen and activated following kinesiotherapy. This, in turn, facilitates synapsis activity. The majority of the muscular fibers of low back muscles are type I fibers which are suitable for long-term and non-severe retractions required to control standing state. Therefore, it is possible to convert them to other types considering muscles elasticity. The size of low back muscles can improve muscular power, bearing capacity and individuals' functions (Ghaderi, 2003). Grantha et al (2001) indicated that the reduced bearing capacity of low back muscles can be originated from muscular atrophy induced by immobility and incorrect use of muscles, decreased blood flow in muscles, the enhanced level of metabolites inside muscles following muscular spasm and long-term stress of muscles. Trunk muscles are among muscles stabilizing spinal column. Therefore, their atrophy affects low back area and can increase loads applying to spinal column. Such increased loads can apply abnormal forces to facet joints and passive elements such as joint capsule and other pain-sensitive elements and, in turn, result in low back pain. Therefore, they play a vital role in exercises for preventing low back pain, in exercise-therapy process for the rapid relief of damages and in post-relief condition for avoiding the repeated return of damages (Granata, Wilson, 2001). According to Figoira et al (2009), the quality of life is an essential health measure. It consists of different dimensions such as physical health, mental health, social relationships, family life, emotions, physical functions, spirituality and professional life. This highlights the necessity of paying attention to the quality of life (Farzam, 1995). Heeder et al (2007) indicated that changes to activities, sleeping, occupational-social performance, sexual relations, bending and unbending, and daily activities are important changes of the quality of life which can result in mental-psychological problems and promote immobility in patients. This is associated with negative effects originated from economic problems such as decreased performance, decreased occupational productivity, increased therapy costs and disability-related costs (Greene & Roberts, 1999). There is no study on the effect of elected combined exercises on females with sciatica. Therefore, this study aims to evaluate the effect of 8 weeks elected combined exercise on the low back pain and lordosis angle of females with sciatica.

METHOD OF STUDY

A total number of 15 patients were sampled among all patients with sciatica referred to medical-sport centers. McGill's questionnaire was first filled by trials in order to evaluate pain severity as the pre-test measure. Low back lordosis was then measured using the flexible ruler and its level was calculated for all trials. The trials then performed the researcher-developed exercise program for 8 weeks. The exercise protocol was as follows: walking in water for 8 weeks and 3 sessions per week each lasting for 30 minutes without additional activity, daily walking for 20 to 30 minutes in free space, performing corrective exercises i.e. pulling knees towards abdomen

and feeling back curvature, 4 sets in mornings and 4 sets in afternoons (each lasting for 30 seconds). Finally, after 8 weeks, the low back lordosis angle was re-measured and the answers of cases to the items of McGill's pain questionnaire were collected as post-test measure.

Flexible ruler

The flexible ruler used in this study had 30 cm length and 0.7 cm width. It was a flexible rule and could get a fix shape. To use the ruler, the studied trials stood in normal posture, with naked feet, on a one-leg retaining bracket. This bracket was designed in a manner that it avoided the upward/backward motion of the trials. The spinal column of the trials was observable from shoulders to the upper side of gluteal area. To measure spinal curvature by the flexible ruler, two bone marks were required. In this study, similar to Youdas' study, the spinous process of T12 vertebra was considered as the beginning point of the curvature and that of S2 vertebra was considered as the end point of it. T12 was used in order to measure the entire curvature of low back. In this method, the trials were asked to equally distribute their weight on two feet, to avoid moving their abdomen and chest forward or backward during measurement and to open their feet 10cm to 15 cm from each other. The ruler then was accurately, without any change in its shape, removed from low back of the trials and placed on a paper. In this way, the curvature of the convex area of the curvature was projected on the paper and T12 and S2 points were marked on it. Then, the points were connected to each other by a straight line and a line was sketched from the center point of the former one and normal to it. The two lines i.e. H and L lines were measured with a ruler (accuracy=millimeter) and was substituted in the relation (X=4(Arc tag (2H/L)) by which lordosis angle was calculated.

McGill pain questionnaire

McGill pain questionnaire (MPQ) was developed by Melzack in 1997 with 20 items. It aims to measure individuals' perception of pain in terms of different pain dimensions i.e. the sensory perception of pain, the emotional perception pain, and the assessment perception of pain, and different and diverse pains. MPQ is one of the most dominant pain measurement instruments used first by Melzack on 297 patients suffered different pains. The modified version of MPS i.e. SF_MPQ was developed by Melzack et al for a short-term, but beneficial, intervention in pain filed. It has been used in 250 studies. MPQ includes two dependent factors: sensory pain which describes individuals' experience of pain and emotional pain which describes emotional effect of pain experience.

Health survey questionnaire SF36 (quality of life questionnaire)

SF36 aims to assess physical and mental health in 8 fields, namely: physical performance, social performance, playing physical role, playing emotional role, mental health, euphoria, body pain and general health. This self-reporting questionnaire which is generally used to evaluate the quality of life and health was developed by Ware and Sherbourner (1992). It has 36 items and 8 fields namely: physical performance, social performance, playing physical role, playing emotional role, mental health, euphoria, body pain and general health. Furthermore, **SF36** provides two general performance measurements: physical component score (PCS) which measures the physical component of health, and mental component score (MCS) which measures the socio-mental dimension of health. The higher the questionnaire score the better is the quality of life. The validity and reliability of this questionnaire in Iranian population were confirmed. In addition, the consistency factor of its 8 micro-scales ranges from 70.0 to 85.0 and its test-retest factor, with an interval of one week, was reported to be 0.43 to 0.79. This

questionnaire is able to differentiate patients from normal people in all indices.

RESULTS

Low back lordosis

Fig. 1 shows low back lordosis specifications of the studied cases.

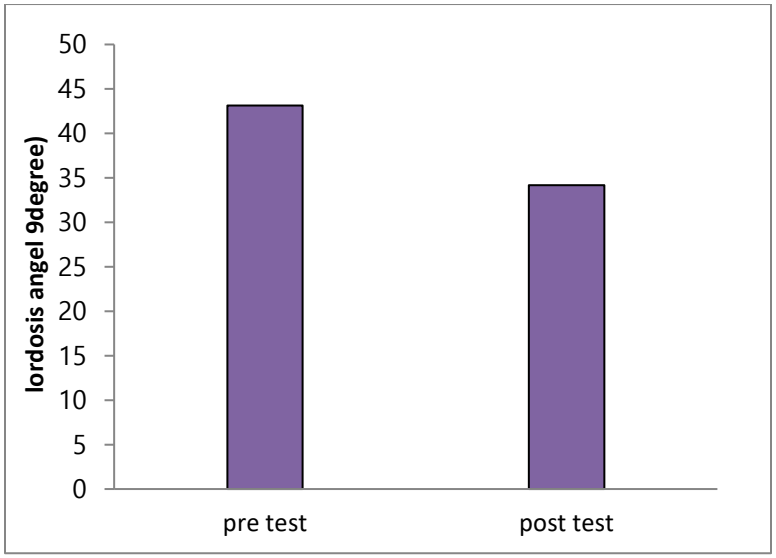

Figure 1: lordosis angle of patients with sciatica

There was a significant difference in the low back lordosis angle of cases before (43.2±0.1) and after (34.37±0.8) exercises (P<0.05).

Sensory perception of pain

Fig. 2 shows the specifications of the feeling perception of pain

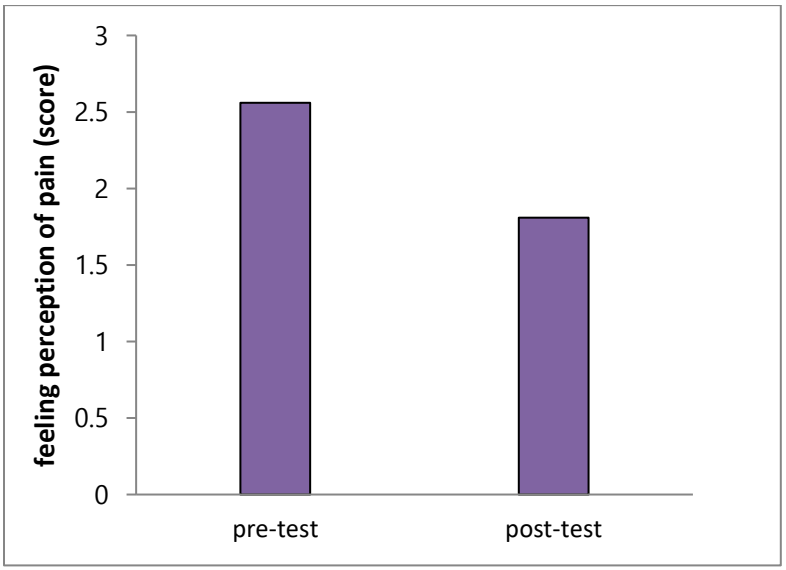

Figure 2: sensory perception of pain

There was a significant difference in the feeling perception of pain of cases before (2.6±0.8) and

after (1.8±0.5) exercises (t=3.3, P<0.05) so that the feeling perception of pain reduced by 37.5%.

Emotional perception of pain

Fig. 3 shows the specifications of the emotional perception of pain.

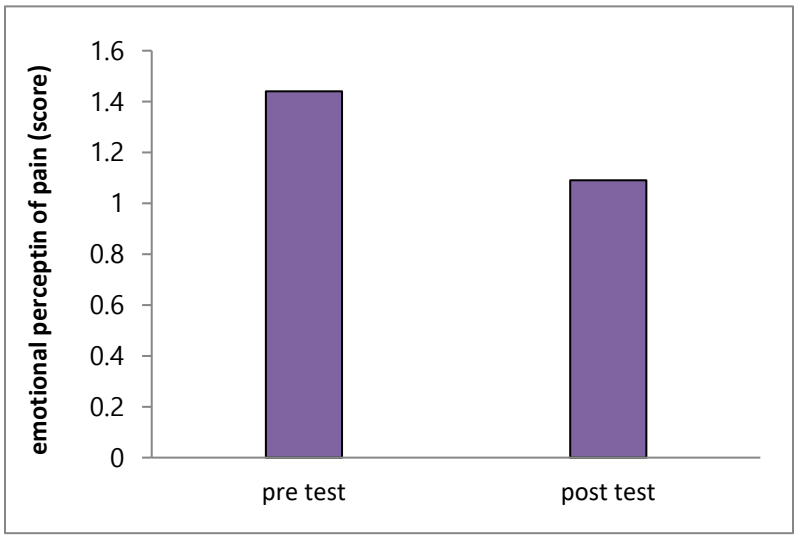

Figure 3: emotional perception of pain

There was a significant difference in the emotional perception of pain of cases before (1.4±0.2) and after (1.09±0.3) exercises (t=2.4, P<0.05) so that lordosis angle reduced by about 17.5%.

Different and diverse pains

Fig. 4 shows the specifications of different and diverse pains.

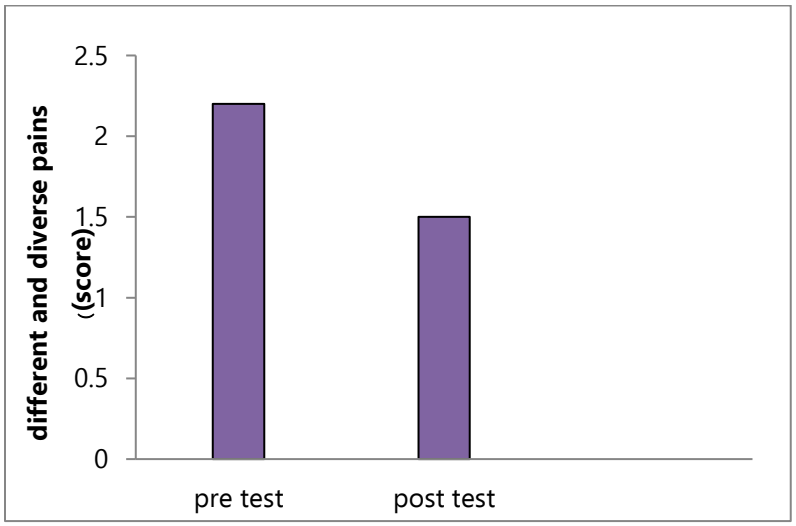

Figure 4: different and diverse pains

There was a significant difference in the different and diverse pains of cases before (2.2±0.6) and after (1.8±0.5) exercises (t=2.6, P<0.05) so that different and diverse pains reduced by about 35%.

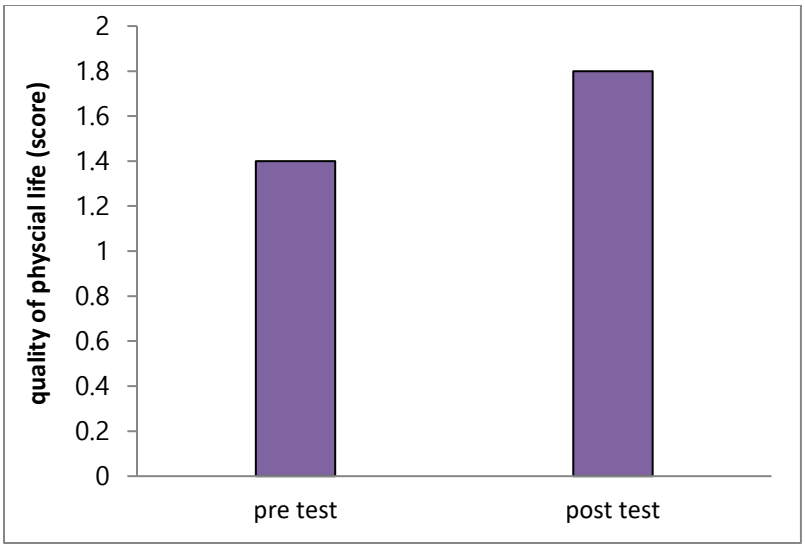

Figure 5: quality of physical life

There was a significant difference in the quality of the physical life of cases before (1.4±0.3) and after (1.8±0.5) exercises (t=3.2, P<0.05) so that the quality of physical life promoted by about 20% and hypothesis 5 was confirmed.

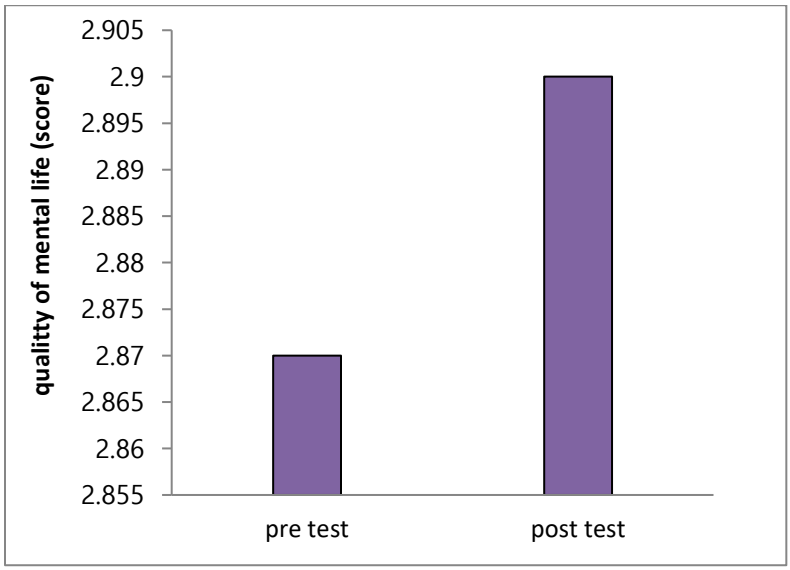

Figure 6: quality of mental life

There was a significant difference in the quality of the mental life of cases before (2.8±0.02) and after (2.9±0.75) exercises (t=0.2, P<0.05) so that the quality of mental life promoted by about 1.5% and hypothesis 6 was confirmed

DISCUSSION

This study aimed to determine the effect of 8 weeks elected exercise on low back lordosis angle and pain in females with sciatica. The results revealed that it improved the low back lordosis angle, mitigated pain and promoted the quality of life of the studied cases. This agrees with the

results of other studies. Our results agree with the results of Farzam (1995), Green et al (1999), Homeril et al (2006) (Farzam, 1995; Greene & Roberts, 1999; Hamill et al., 2006). Carter et al (2002) evaluated the effect of stretch exercises and concluded that corrective exercises affect chest kyphosis and low back lordosis abnormalities and reduces spinal curvature (Carter et al., 2002). Hindel et al (20129 evaluated the mechanism and the effect of neuromuscular stretching exercises on motor range and performance and muscles' function. They concluded that neuromuscular stretching improves muscular power and increases motor range (Hindle et al., 2012). Myer observed in his study the significant decrease of low back lordosis angle. Strength trainings affect the tendon length of muscles and displace different skeletal sections and stabilize ligaments. On the other hand, stretch exercises sever as the coordinator of agonis and antagonist muscles. Therefore, such exercises increase the length of muscles in concave side, increase power of convex side and in turn decrease abnormalities.

Our results did not agree with the results of Garshasbi et al (2011) study on pregnant females. Their results did not show the significant decreases of low back lordosis. This difference may be rooted in the fact that during pregnancy anterior pelvic tilt is induced because abdominal muscles loosen and become massive and it is principally impossible to perform abdominal muscle strengthening exercises until labor (Garshasbi, Faghihzade, 2011). The effect of abdominal muscles, as one of the dynamic factors of the increased low back lordosis angle and pain, has been received great attention from old times. According to the aforementioned literatures, today machine-like living causes people to rarely need abdominal muscles extraction and strong activities. This gradually weakens abdominal muscles and consequently creates low back pain (Salavati, 2002).

Our results reported the significant increase of the quality of life of the studied cases after exercises. This agrees with the results of Rozenzvick et al (2010), Carlson et al (2012), Cool et al (2010) and Moron et al (2008). Participating in physical activities provide a proper structure for socialization. The patients who participate in exercising programs show better mental and intellectual performance. Sport plays a vital role in mitigating mental stresses. In addition, people who regularly exercise have higher percentage of body net mass compared to inactive people (Rosenzweig et al., 2010; Carlson, Linda, 2012; Colle et al., 2010; Morone et al., 2008).

In summary, it can be concluded from the results of previous studies and our study that performing combined exercises can stretch and strengthen agnois and antagonist muscles and decrease low back lordosis angle in people with sciatica.

CONCLUSION

The results of our study revealed that combined exercises can decrease low back lordosis abnormalities, mitigate pains induced by sciatic abnormalities and promote the quality of life of the studied cases. Combined hydro and dry land-specific exercises are used as supplementary exercises in order to mitigate the tiredness and monotony of exercises and promote the effectiveness of exercises with respect to pain level.

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