DIFFERENTIATION OF THE PAIN IN THE LUMBOSACRAL REGION

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Abstract. The pain in the lumbosacral region is a very common and socially important problem. It is established that 90% of the population aged between 35 and 50 years of age are suffering from a certain discomfort in the lumbosacral region. The pain in this region can be of a different nature – neurological, traumatic, psychological, etc. Determining the type and location of pain in the lumbosacral region helps to diagnose correctly, which aids to choose the right treatment. The aim of this research is to define the nature of lumbar pain in patients that visited, for 1 month, the kinesitherapy laboratory at SWU "Neofit Rilski," Blagoevgrad, and after we analyzed the results, we could determine the kinesitherapy approach. In this research took part 30 patients (16 male and 14 female), which had pain in the lumbosacral region, at an average age of 45.37 ± 2.61 years. We used the following tests, in order to determine the nature of the pain in the lumbosacral region: Straight leg raise test, Bragard test, and a test to assess femoroacetabular impingement (FADIR Test). One of the most common tests is the Straight leg raise test. Its proper execution and interpretation can lead to a correct diagnosis of the pain in the lumbar region. We performed the Straight leg raise test, during the examination of every patient. The pain in the lumbar region, provoked by the test, from 30° to 70° is a prove for disc lesion, while above 70° - for problem in the sacroiliac joints. We applied, on some of the subjects, additional stress by performing dorsiflexion (Bragard test). After performing the Straight leg raise test, we determined that 7 of the patients have low back pains connected with the muscles nature, 7 have problems with the sacroiliac joints, and 10 of them are in pain in the lumbar region caused by disc lesion. The test was negative in 6 of the participants. We performed on them additional test for femoroacetabular impingement (FADIR test) which was positive. It could mean starting cause for the beginning of early osteoarthritis of the hip. Recommendations were given to each group for the kinesitherapy approach needed in order for the therapy to be successful. After the recommendations, we followed-up on their condition by performing the tests again and it was determined that there is an improvement in the condition of the patients. In conclusion, we can summarize, the differentiation of the pain in the lumbosacral region, allows us to choose proper kinesitherapeutic means which can lead to control of the pain in that region. That's why, it is necessary to know, apply and interpret correctly the basic tests used to determine the nature of the discomfort in the lumbosacral region.
Keywords: Pain in the lumbosacral region, test, kinesiotherapy

1. INTRODUCTION

It is found that more than 90% of population aged 30-35 years suffers from a determined discomfort in the lumbosacral region. The main etiological phenomenon for this is the occurring with age degenerative vertebral osteochondrosis (a chronic non-inflammatory disease of vertebra and the ligament apparatus). [10]. The traditional conception continuing for decades that etiology of 80% to 90% of the cases of lumbar pains is unknown is wrong. In most cases, the low-back pains can be attributed to a specific pain generator, with its own specifics and different therapeutic option. [1]. The pains in this area can have a different nature – they can be neurological, traumatic, psychical, etc. The pains in low back are often caused by non-pathological functional disturbances, which are best detected by physical examination and cannot be determined adequately using imaging examinations, particularly the following of them:

segmental dysfunction (for example, "blockages"), the sacroiliac joint syndrome, changed spinal statics (for example, hyperlordosis or straightening of normal lumbar lordosis), muscular dysfunction (for example, crossed syndromes of Janda, shortened muscles, trigger points), changes in connective tissue (for example, swelling, fascial hypomobility) and systemic conditions (for example, non-coordination, insufficiently deep stabilization or continuous hypermobility). [2]. The determination of the pain type and localization in the lumbosacral region assists correct diagnosis which facilitates correct treatment.

2. EXPOSITION

The aim of the study was to determine the nature of lumbar pains in patients visiting the laboratory of kinesitherapy at the Neofit Rilski South-West University, Blagoevgrad, for 1 month as well as determination of kinesitherapeutic approach after the analysis of results.

Contingent. The study included 30 subjects (16 male and 14 female) reporting pains in the lumbosacral region. The average age of the study subjects was 45.37± 2.61 years. To differentiate the nature of pains in the lumbosacral region in the subjects of our study, we used the following tests performed prior and following the performed

therapy: Straight leg raise test, the Bragard test, active knee extension test, FAIR test and the femoro-acetabular impingement test (FADIR test).

Methods of study. One of the most common tests for diagnosis of the pains in lumbosacral region is the Straight leg raise test. According to Hall и McIntosh (2014), with a correctly administered and interpreted Straight leg raise test, no use of additional tests is required. Contradictory opinions, the lack of standardized tests and different interpretation of the definition of a positive test lead to misleading and wrong decisions on treatment. As a result of this, a large number of false-positive results are seen. [5]. Wise (Magee) described the first 35° of motion from the test as a weakness of the sciatic nerve, from 35° to 70° – as a tension of the sciatic nerve, and over 70° the pain is attributed to sacroiliac joints. [11]. Based on our own practice, we support the opinion that the correct fulfillment of the Straight leg raise test leads to the correct diagnosis of pains in the lumbosacral region.

In cases, in which the Straight leg raise test provoked radicular pain, we performed the Bragard test. It is used, when the Straight leg raise test is positive at a given moment: the leg is dropped under the angle of radicular pain and dorsiflexion of the foot is performed. If the radicular pain increases, the test is considered positive.[6]. We administered the Bragard test to generate an additional stress, which enables the follow-up of a residual radicular pain in the study subjects after therapy.

With a negative Straight leg raise test, we used the test for diagnosis of femoro-acetabular impingement (FAI) to differentiate the lumbosacral pain and the pain in the hip. The main and most used clinical test is the provocation FADIR test (pain in flexion, adduction and internal rotation). For FAI is characteristic a reduction of the range of motion of the affected joint, which is especially clearly detectable in one-sided involvement and comparison to the non-affected joint. The positive FADIR test can correspond to an initial arthrosis change in the hip. [9]

In some of subjects, in whom the performance of the Straight leg raise test did not cause pain in the lumbar area, however, causing pain in the hamstring, we administered an active knee extension test. The subjects were in supine position with the hip flexed to 90 degrees and knee flexed. The test was performed on the right lower extremity and later on the left lower extremity and the pelvis was stabilized to the couch. [8]

To differentiate the pain due to a disc lesion and the pain of muscular origin, we administered a FAIR test. The test is sensitive and specific to the piriformis syndrome. FAIR means flexion, adduction and internal rotation. The purpose of this test is to stretch the piriformis muscle compressing the sciatic nerve. [4]

Methodology. The study subjects visited the laboratory of kinesitherapy at the Neofit Rilski South-West University once weekly for 1 month. After establishment of medical history, each patient was studied by the Straight leg raise test, the Bragard test, the FADIR test, active knee extension test and FAIR test. After the performed examination of the study subjects with the Straight leg raise test, we found that it was positive in 24 subjects. After the administration of the rest tests, we found that 7 patients had lumbar pain of muscular nature, 7 – a problem in sacroiliac joints and 10 – pain in the lumbar area due to a disc lesion. The test was negative in 6 subjects. The study subjects received manual therapy, autostretching, exercises on balancing pillow, and exercises in suspension, positional treatment and corset treatment. Depending on the differentiated pain in lumbosacral region of the subjects, appropriate exercises that were visualized were selected. The subjects were informed on the importance of performing the exercises at home settings. After the ending of the one-month period of study, the study subjects were tested again with the aforementioned tests and the results were compared to the baseline tests.

3. RESULTS

Data was processed with the software package for statistical processing of data Prism 3.0 and compared for statistical reliability with a Wilcoxon signed rank test.

After the administration of the Straight leg raise test we found that it was positive in 24 subjects. Using goniometer we measured the reached degrees prior and following the performed kinesitherapy. In 7 subjects the pain in lumbar area appeared above 70°, which is associated with pains in sacroiliac joints. The pain and dysfunction of sacroiliac joints affect 15-25% of the patients reporting low-back pain. [7] The mean and standard deviation ($\overline{X}$± SD) before performed therapy to them was 82.29°±4.61, and after it – 89.57°±1.13. In 7 other patients we found pain due to muscular shortening. Their mean and standard deviation before treatment were ($\overline{X}$± SD) 65.86°±5.96, and after it – 73.71°± 5.99. We administered additional tests for differentiation of the pain localization – and active knee extension test and the FAIR test. We found that in 4 subjects the pain was caused by stretching of the hamstring, but it did not radiate in the lumbar region. Misry, Vias and Shelt found a correlation between a shortened hamstring and lumbar pain. In 3 subjects we found pain due to the piriformis syndrome. In 10-15% of people, the entire sciatic nerve or a part of it passes through the piriformis muscle, before descending on the leg. The shortened and tensioned piriformis muscle presses the sciatic nerve and thus it can cause the piriformis syndrome. [3]. In 10 subjects we found data for a disc lesion. The obtained mean and standard deviation ($\overline{X}$± SD) in them were 59.20°±5.96 before

the performed therapy and 67°±4.45 after it. The same patients underwent the Bragard test. The mean and standard deviation ($\bar{X}$± SD) from it were 48.40°±6.62 at baseline and 61.9°±5.09 at the completion of the study. In 6 subjects we found a negative Straight leg raise test. We performed a provocation FADIR test in them. It was positive which can demonstrate initial arthrosis changes.

4. RECOMMENDATIONS

After differentiating the pains in lumbar region, we made the following recommendations to the separate patient groups participating in our study:

1. For the patients with pains of muscular nature, we proposed performance of the autostretching and stretching exercises on the affected muscles – hamstring and the piriformis muscle.
2. For the patients with problems in sacroiliac joints, we recommended changes in motor habits and improvement of mobility in the lumbar compartment.
3. For the patients with FAI, we applied specific exercises for impacting the pain and improving the range of motion in the corresponding hip.
4. In the patients with a disc lesion, we proposed our own method consisting of positional treatment, corset treatment and exercises for improvement of the range of motion and stabilization of the muscles of lumbar spine at a later stage.

5. CONCLUSION

In conclusion, we can generalize that differentiation of the pains in lumbar region enables the performance of a correct selection of kinesitherapeutic tools, which, in turn, can lead to the management of the pains in this area. Therefore, it is necessary to know, administer and interpret correctly the main tests used for the determination of the nature of discomfort in lumbosacral region.

REFERENCES

Allegri, M., Montella, S., Salici, F., Valente, A., Marchesini, M., Compagnone, C., Baciarello, M., Manferdini ME. & Fanelli, G. (2016). *Mechanisms of low back pain: a guide for diagnosis and therapy*, version 2; peer review: 3 approved]. *F1000Research* 2016, 5(F1000 Faculty Rev):1530 (https://doi.org/10.12688/f1000research.8105.2)

Casser, HR., Seddigh,S. & Rauschmann, M. (2016). *Acute lumbar back pain*, Dtsch Arztebl Int, 113(13), p.223-234

Dimitrov, H. (2018). Piriformis syndrome i kinesiterapia, www.puls.bg, 15.08.2018. [Димитров, Х. (2018). *Пирифомис синдром и кинезитерапия*, www.puls.bg, 15.08.2018]

Ebraheim, N.,Andrews, K.,Stirling, B. & Tanois, M. (2017). *Piriformis Syndrome or true sciatica: Are they the same or different?*, MOJ Orthopedics &Rheumatology, 9(3) DOI: 10.15406/mojor.2017.09.00357

Hall, H. & McIntosh *G*. (2014). *Passive Straight leg raise test: definition, interpretations and utilization*, Journal of Current Clinical Care, 4(6) p.24-32

Homayouni, K., Jafari, SH. & Yari, H. (2018). *Sensitivity and specificity of modified Bragard test in patients with lumbosacral radiculopathy using electrodiagnosis as a reference standard*, J Chiropr Med, 17(1), p.36-43

Jonely,H., Brismee, JM., Desai, MJ. & Reoli,R. (2015). *Chronic sacroiliac joint and pelvic girdle dysfunction in a 35-year-old nulliparous woman successfully managed with multimodal and multidisciplinary approach*, J Man Minip Ther., 23(1), p.20-26

Misty, GS., Vias,NJ. & Sheth, MS. (2014). *Comparison of hamstrings flexibilitu in subjects with chronic low back pain versus normal individuals*, Journal of Clinical &experimental research, 2(1), p.85-88

Stefanov, V., Rusimov, V., Tsatschev, N., Georgiev, A. & Vasilev, V. (2017). Otkrita hirurgia pri femoro-acetabularnia impingment. Meditsina i sport, 3-4, s. 8-10. [Стефанов, В., Русимов, В., Цачев, Н., Георгиев, А. & Василев, В. (2017) *Открита хирургия при феморо-ацетабуларния импинджмънт*, Медицина и спорт, 3-4, с.8-10]

Todorova, G., Georgieva, Sv. & Gavrailov, Y.(2015). Diferentsialen kinesiterapevtitschen podhod pri lumbo-sacralni patologii, Nautschni trudove na Rusenskia universitet, 54 (8,1), s.41-45. [Тодорова, Г., Георгиева, Св. & Гавраилов, Й. (2015) *Диференциален кинезитерапевтичен подход при лумбо-сакрални патологии,* Научни трудове на Русенския университет, 54(8,1), с. 41-45]

Wise, CH. (2015). *Ortopedic Manual Physical Therapy*, F.A. Davis Company, Philadelphia, p.451