International Journal of Sport, Exercise and Health Research

Case Report

IJSEHR 2019; 3(1): 1-4 © 2019, All rights reserved www.sportscienceresearch.com Received: 24-05-2019 Accepted: 09-07-2019

Investigation of the Effect of Conventional Physiotherapy and Game Based Training on Young Soccer Player with Lumbar Spondylolysis: Case Report

Murat Emirzeoğlu¹, Özlem Ülger²

- 1 Physiotherapist, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Karadeniz Technical University, 61080, Trabzon, Turkey
- **2** Professor, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Hacettepe University, Samanpazari 06100, Ankara, Turkey

Abstract

Lumbar spondylolysis (LS) is an occurrence that is not completely clear but may occur due to recurrent hyperextension and rotation in the lumbar spine. It is frequently seen in adolescent athletes with low back pain, and conservative and surgical treatment is not clearly superior to each other. In this case report, it was shown that conventional physiotherapy could reduce symptoms and contribute to a reliable return to sports in a soccer player with LS. In addition, it was found that game-based training could increase the balance and performance of the athlete.

Keywords: Conventional Physiotherapy, Game Based Training, Lumbar Spondylolysis.

INTRODUCTION

Low back pain (LBP) is a common problem in young athletes. The prevalence of LBP in adolescent age group is between 20% and 30% ^[1]. Spondylosis is a defect of the pars interarticular of lumbar vertebrae and causes LBP in approximately 80% of adolescent football players ^[2]. It is common in children aged between 5 and 10 years and one of the common causes of pain in the lower back and lower extremities of athletic individuals ^[3]. Genetic susceptibility is one of the risk factors, although the etiology is not clear ^[4]. In terms of the mechanism of injury, recurrent lumbar hyperextension and rotation is a risk factor in the immature spine ^[3,5,6]. A high percentage is observed in football referees, rowers, dancers and gymnasts. There is limited evidence for the superiority of conservative and surgical treatments against each other in the treatment of spondylolysis in athletes ^[7]. In this case report, the football player with LS was treated using traditional physiotherapy approaches and the effect of game-based training on the balance and performance after the return to sport phase is examined. The data from the studies prove that this type of training can help to improve physical fitness between children and adolescents ^[8,9].

CASE REPORT

A male soccer with left foot dominance in his eighteen years old applied with LBP. He stated that he felt pain on the left side of the lumbar region during the training. He said that he had more pain in the day when he performed double training and he had unbearable pain in a match. With the help of physical examination and radiographic imaging, the athlete was diagnosed with L5 vertebrae spondylolysis by an experienced orthopedist in the field of sports. Athlete has been actively playing football for ten years. In addition, he had been high jump for the last two years.

Conventional Physiotherapy

Evaluation

The athlete had a risk for spondylolysis in terms of sports. In the other evaluations, there was no limitation of lower extremity and trunk joint. The paraspinal muscles in the thoracolumbar region (TLR) were stiffness. In posture evaluation; the right shoulder and scapula were lower than the left. Lower extremity length measurement revealed that the right lower limb was as short as 1 cm. There was an increase in

*Corresponding author: Özlem Ülger Professor, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Hacettepe University, Samanpazari 06100, Ankara, Turkey Email: ozlemulger@yahoo.com Phone: +903123243847 Fax: +903123052012

lumbar lordosis and pelvic anterior pelvic tilt. He had no sleep problems and his pain was evaluated by visual analog scale. He stated that his pain was 4/10 at night or rest and 8/10 during the activity. In the evaluation performed by the Oswestry survey, it was observed that LBP was mildly (32/50) restricted to the daily activities of our patient.

Special tests of the lumbar region were used in the evaluation of the athlete. Straight leg raising, Patrick Faber, femoral nerve stretching, sacroiliac compression, pelvic compression, Geaslen and Shear tests were performed. The result of all these tests was recorded as negative.

Treatment

Endorphinic TENS was applied to the lumbar region of the athlete with the TENS 6 device. At the same time, in the prone position, a hot-pack was performed to the TLR for 15 minutes. Then, classical massage was applied to the TLR and transverse friction massage was applied to the paraspinal muscles. The athlete warmed up in the bike for 15 minutes before the exercise program. Posterior pelvic tilt, cat and camel, bridge, four-way plank exercises were included in the exercise program. Core exercises, vertimax workout and balance exercises with the bosu ball were applied within the scope of rehabilitation. Physiotherapy was applied twice a week for two weeks. Exercises were carried out in a controlled and progressive manner for five weeks, one set per day. The number of repeats in the set ranged from 8 to 15. At the sixth week, flat racing were started. He ran the first two days 2x12 minutes, three and fourth days 2x15 minutes. The running time was increased in the following days. Field studies started in the seventh week. He started working with the team on the ninth week.

Game Based Training

Evaluation

Since previous injuries of adolescent athletes were at risk for new injuries, the athlete was invited to be evaluated one year after returning to sports ^[10]. It was determined that the athlete was away from the sport for ten days due to the left hamstring injury. This injury occurred due to impact. The balance of the athlete was evaluated considering the relationship between the weak balance and the increased injuries ^[11]. In addition, performance measurements were taken because it is one of the important parameters in terms of athletic career.

The Star Excursion Balance Test was used to evaluate dynamic balance. Measurements were taken in the anterior (A), anterolateral (AL), lateral (L), posterolateral (PL), posterior (P), posteromedial (PM), medial (M) and anteromedial (AM) directions. Three measurements were averaged. Data were normalized using lower extremity length.

Speed Dribbling test was used to evaluate performance. The athlete completed the first 30 meters of the track without the ball and the remaining 20 meters with the ball (Figure 1). The test was repeated three times at three minute intervals and these measurements were averaged. Low time was evaluated as better performance.

Training

In the evaluation, it was seen that the athlete did not have enough findings to be included in the treatment program. But in terms of balance and performance, we thought that support could benefit the athlete. Therefore, after the first measurements, the athlete received one hour of game-based training. In this training, the Xbox One game console and Kinect sensor were used. Training was carried out with the games in the Kinect Sports Rivals game package. After the training, the tests were repeated. The content of the training is shown in Table 1.

RESULTS

After nine weeks of physiotherapy and field studies, the athlete started training with a minimal pain. Within one year of his return to sports, the athlete suffered no injuries other than a low-severity injury. The right side balance of the athlete showed improvement in all directions after the training. Left balance showed improvement except PM and AM directions. The post-training performance was better than before (18.67 sec, 19.40 sec, respectively). The results of the dynamic balance measurements are shown in Table 2, and the results of the performance measurements are shown in Figure 1.

Table 1: Game Based Training

| Gama | Training | Time |
|--------------------|--|-------|
| Game | Training | (min) |
| | Playing as normal | 2 |
| Bowling | Playing with right hand while right eye is closed | 4 |
| (12 min) | Playing with left hand while left eye is closed | 4 |
| | Rest | 2 |
| | Playing as normal | 2 |
| Wake resing | Alternately playing on the right or left foot | 4 |
| (12 min) | Alternately playing on the right or left foot | 4 |
| (12 min) | while one eye is closed | |
| | Rest | 2 |
| | Playing as normal | 2 |
| | Playing with right hand on the right foot | 2 |
| | Playing with left hand on the left foot | 2 |
| Targetshooting | Playing with right hand on the right foot while | 2 |
| (12 min) | right eye is closed | |
| | Playing with left hand on the left foot while left | 2 |
| | eye is closed | |
| | Rest | 2 |
| | Playing as normal | 2 |
| | Playing on the right foot | 2 |
| Football | Playing on the left foot | 2 |
| (12 min) | Playing on the right foot while left eye is closed | 2 |
| | Playing on the left foot while right eye is closed | 2 |
| | Rest | 2 |
| | Playing as normal | 2 |
| | Alternately playing on the right or left foot with | 4 |
| Tennis (12 min) | dominant hand | |
| | Alternately playing on the right or left foot with | 4 |
| | non-dominant hand while dominant side eye is | |
| | closed | |
| | Rest | 2 |

| Table 2: Dynamic | balance data b | efore and aft | ter training |
|------------------|----------------|---------------|--------------|
|------------------|----------------|---------------|--------------|

| Direction | Side | Before training (cm) | After training(cm) |
|-----------|-------|----------------------|--------------------|
| A | Right | 59.33 | 65.33 |
| | Left | 59.66 | 60.33 |
| AL | Right | 62.33 | 72.66 |
| | Left | 61.66 | 66.33 |
| L | Right | 73.66 | 78.66 |
| | Left | 65.00 | 75.33 |
| PL | Right | 93.66 | 99.33 |
| | Left | 84.33 | 101.33 |
| Ρ | Right | 70.66 | 81.00 |
| | Left | 74.33 | 85.00 |
| PM | Right | 69.33 | 87.00 |
| | Left | 90.66 | 89.33 |
| М | Right | 55.33 | 58.33 |
| | Left | 56.00 | 57.00 |
| AM | Right | 54.00 | 59.33 |
| | Left | 60.00 | 57.33 |



Figure 1: Performance data before and after training

DISCUSSION

In this case study, it was seen that conventional physiotherapy applications significantly reduced pain and contributed to return to sports in a football player diagnosed with spondylolysis. It was found that in the following period, when the game-based training was used, the balance and performance of the athlete were improved.

There is no consensus on the role of surgical and conservative treatments because of lack of blinding evaluations, lack of control groups, and lack of patient compliance with exercise programs in studies reported on spondylolysis ^[12]. These should be selected according to the patient's specific condition ^[13]. However, in adult athletes where conservative treatment is unsuccessful, surgery can reduce pain and promote return to sports ^[14].

In our study, conservative treatment was performed without surgery. In this context, we think that focusing on the core stabilization and giving pelvis exercises contribute to the decrease in the complaints of the athlete. In this context, Lawrence et al. stated that the exercises focusing on the stabilization and neutral position of the spine should be included in the physiotherapy program ^[15]. In addition, TENS may have been effective in reducing pain ^[16]. We think that classic and

transverse friction massage reduces the spasm in the paraspinal muscles and stress at lumbar region.

Within the scope of physiotherapy, the athlete was supported by sports-specific strength and endurance exercises. We think that progressive and controlled progress in this program contributed to the return of the athlete. The positive results of conservative treatment in our study support different researchers ^[6].

The positive effects of active video games on postural control and performance have been shown by different researchers ^[17-19]. The improvement in balance and performance of our case may be supported by these previous results or may be caused by changes in the content of the training. During the training, one eye closed and/or one foot may have contributed to the development of balance. In addition, visual and auditory feedback in games may contribute to performance improvement as well as balance. Since active video games develop attention, visual spatial ability and executive functions, the athlete may be positively affected by these situations. The development in equilibrium and performance may also be due to the positive effect of aerobic training on learning ^[20].

CONCLUSION

As a result; traditional physiotherapy may be preferred because it contributes to reducing the symptoms of LS athletes and returning them to sports reliably. In order to improve the athlete's balance and performance, game-based training can be included in training programs.

Limitations

It is the limitation of the study that the balance and performance are not evaluated during the treatment of the athlete.

Conflict of interest

The Authors declare no conflict of interest.

REFERENCES

- 1. Patel DR, Kinsella E. Evaluation and management of lower back pain in young athletes. Transl Pediatr. 2017;6(3):225-235.
- Iwamoto J, Abe H, Tsukimura Y, Wakano K. Relationship Between Radiographic Abnormalities of Lumbar Spine and Incidence of Low Back Pain in High School and College Football Players. Am J Sports Med. 2004;32(3):781-6.
- 3. Stinson JT. Spondylolysis and spondylolisthesis in the athlete. Clin Sports Med. 1993;12(3):517-28.
- 4. Tallarico RA, Madom IA, Palumbo MA. Spondylolysis and spondylolisthesis in the athlete. Sports Med Arthrosc Rev. 2008;16(1):32-8.
- McCleary MD, Congeni JA. Current concepts in the diagnosis and treatment of spondylolysis in young athletes. Curr Sports Med Rep. 2007;6(1):62-6.
- 6. Morita T, Ikata T, Katoh S, Miyake R. Lumbar spondylolysis in children and adolescents. J Bone Joint Surg Br. 1995;77:620–625.
- Scheepers MS, Streak Gomersall J, Munn Z. The effectiveness of surgical versus conservative treatment for symptomatic unilateral spondylolysis of the lumbar spine in athletes: a systematic review. JBI Database System Rev Implement Rep. 2015;13(3):137-73
- Gao Z, Chen S. Are field-based exergames useful in preventing childhood obesity? A systematic review. International Association for the Study of Obesity. 2014;15:676-91.
- Warburton D, Bredin S, Horita L, Zbogar D, Scott JM, Esch B vd. The health benefits of interactive video game exercise. Appl. Physiol. Nutr. Metab. 2007;32(4):655-63.
- Emery CA, Meeuwisse WH, Hartmann SE. Evaluation of Risk Factors for Injury in Adolescent Soccer: Implementation and Validation of an Injury Surveillance System. Am J Sports Med. 2005 Dec;33(12):1882-91
- Butler RJ, Lehr ME, Fink ML, Kiesel KB, Plisky PJ. Dynamic Balance Performance and Noncontact Lower Extremity Injury in College Football Players. Sport Heal A Multidiscip Approach. 2013;5(5):417–22.

- Garet M, Reiman MP, Mathers J, Sylvain J. Non operative treatment in Lumbar spondylolysis and spondylolisthesis: a systematic review. Sports Health. 2013 May;5(3):225-32
- Liu Y, Yin Q, Gu S, Sun Z, Rui Y, Shou K. Research progress of stres fracture of lumbar pedicle. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2013;27(2):240-2.
- Scheepers MS, Streak Gomersall J, Munn Z. The effectiveness of surgical versus conservative treatment for symptomatic unilateral spondylolysis of the lumbar spine in athletes: a systematic review. JBI Database System Rev Implement Rep. 2015;13(3):137-73.
- 15. Lawrence KJ, Elser T, Stromberg R. Lumbar spondylolysis in the adolescent athlete. Phys Ther Sport. 2016;20:56-60.
- 16. Vance CG, Dailey DL, Rakel BA, Sluka KA. Using TENS for pain control: the state of the evidence. Pain Manag. 2014;4(3):197-209.
- 17. Paukowits S, Stöggl T. Balance Trainability Using the Nintendo Wii Balance Board in Sportive People. Sportverl Sportschad 2014;28(1):36–43
- Puh U, Majcen N, Hlebš S, Rugelj D. Effects of Wii balance board exercises on balance after posterior cruciate ligament reconstruction. Knee Surgery, Sport Traumatol Arthrosc. 2014;22(5):1124–30.
- Baltaci G, Harput G, Haksever B, Ulusoy B, Ozer H. Comparison between Nintendo Wii Fit and conventional rehabilitation on functional performance out comes after hamstring anterior cruciate ligament reconstruction: Prospective, randomized, controlled, double-blind clinical trial. Knee Surgery, Sport Traumatol Arthrosc. 2013;21(4):880–7
- 20. Perini R, Bortoletto M, Capogrosso M, Fertonani A, Miniussi C. Acute effects of aerobic exercise promote learning. SciRep. 2016;6:25440.