



EFFECTIVENESS OF PHYSIOTHERAPY PATIENT WITH REPEATED FAILED SPINAL SURGERIES

Gizem SOYLU^{1*}, HASAN ERKAN KILINÇ²

ABSTRACT

Purpose: The aim was to report the effects of physiotherapy and rehabilitation on pain, drop foot severity, lower extremity range of motion, muscle strength, disability level and emotional status in a 64-year-old male patient with repeated failed lumbar spinal surgery.

Method: Physiotherapy and rehabilitation were applied for twelve weeks, with two sessions per week, for an average of 60 minutes per session. Pain severity was assessed using the Numeric Pain Scale; range of motion of the trunk, lower extremity and foot was measured using the Universal Goniometer; hip, knee, ankle and big toe muscle strength was assessed using the Manual Muscle Strength Test, The Oswestry Disability Questionnaire and the Roland Morris Disability Questionnaire were used to assess disability status due to low back pain, the Short Form-36 Quality of Life Scale (SF-36) was used to assess quality of life and the Beck Depression Scale was used to assess emotional status.

Results: Improvements were noted in the severity of the drop foot, the level of pain during activity, particularly in the active range of motion of lumbar flexion, extension and hip flexion, and in the muscle strength of the lower extremities, with right dorsal flexion being the most prominent. Pain during activity decreased from 8 to 4 on the numerical pain scale. In addition, significant positive changes were reported in the Ostwestry Disability Index, Roland Morris Disability Questionnaire and SF-36 physical function sub-parameter scores. Finally, the daily use of anesthetics was discontinued.

Discussion: In patients who have undergone failed lumbar spinal surgery, treatment options with potential risks such as side effects, addiction and complications are widely used. Physiotherapy and rehabilitation can be considered as the first option in these patients.

Keywords: Intervertebral Disc Displacement, Surgical Procedures, Operative, Physical Therapy Modalities, Low Back Pain

ÖZET

Amaç: Tekrarlı başarısız lumbal omurga cerrahisi geçiren 64 yaşında erkek hastada fizyoterapi ve rehabilitasyonun ağrı, düşük ayak şiddeti, alt ekstremitte eklemler hareket açıklığı, kas kuvveti, sakatlık düzeyi ve emosyonel durum üzerine etkilerini bildirmeyi amaçladık.

Yöntem: Fizyoterapi ve rehabilitasyon on iki hafta boyunca haftada iki seans, seans başına ortalama 60 dakika uygulandı. Ağrı şiddeti Sayısal Ağrı Ölçeği kullanılarak değerlendirildi; gövde, alt ekstremitte ve ayağın hareket açıklığı Universal Gonyometre kullanılarak ölçüldü; kalça, diz, ayak bileği ve ayak başparmağı kas kuvveti Manuel Kas Gücü Testi, Oswestry Engellilik Anketi ve bel ağrısına bağlı sakatlık durumunu değerlendirmek için Roland Morris Engellilik Anketi, Kısa Form-36 Yaşam Kalitesi Ölçeği kullanılarak değerlendirildi. Yaşam kalitesini değerlendirmek için (SF-36), duygusal durumu değerlendirmek için Beck Depresyon Ölçeği kullanıldı.

Sonuçlar: Düşük ayağın şiddetinde, aktivite sırasındaki ağrı düzeyinde, özellikle lumbal fleksiyon, ekstansiyon ve kalça fleksiyonunun aktif hareket aralığında ve sağ dorsal fleksiyonla alt ekstremitte kas kuvvetinde iyileşmeler kaydedildi. Ayrıca Ostwestry Engellilik İndeksi, Roland Morris Engellilik Anketi ve SF-36 fiziksel fonksiyon alt parametre puanlarında da anlamlı olumlu değişiklikler rapor edildi. Son olarak günlük analjezik kullanımına son verildi.

Tartışma: Başarısız lumbal omurga cerrahisi geçirmiş hastalarda yan etki, bağımlılık ve komplikasyon gibi potansiyel riskleri olan tedavi seçenekleri yaygın olarak kullanılmaktadır. Bu hastalarda ilk seçenek olarak fizyoterapi ve rehabilitasyon düşünülebilir.

Anahtar Kelimeler: İntervertebral Disk Yer Değiştirmesi, Cerrahi İşlemler, Operatif, Fizik Tedavi Modaliteleri, Bel Ağrısı

¹Research Assistant, Hacettepe University, Faculty of Physical Therapy and Rehabilitation Spine Health Unit, 06100, Ankara, Türkiye

²Associate Professor, Hacettepe University, Faculty of Physical Therapy and Rehabilitation Spine Health Unit, 06100, Ankara, Türkiye

*Corresponding author e-mail: gizemsoylu@hacettepe.edu.tr

INTRODUCTION

Low back pain (LBP) is a highly prevalent problem, with a prevalence of 37% of the general adult population and a lifetime prevalence between 60% and 85%. It has been reported that the lumbar disc herniation is among the top three causes of LBP. (1-3). It is also emphasized that the number of spine surgeries has recently tended to increase (4). However, it is noteworthy that the incidence of failed lumbar spinal surgery ranges from 10% to 46% (5). The International Association for Pain Research defines failed back surgery syndrome (FBSS) as lumbar spine pain of unknown cause that persists despite surgical intervention, or that occurs after surgery for spine pain in the same topographic location at baseline (6). The main reasons for failing lumbar surgeries have been explained as failure to clearly identify the etiology of the patient's pain, inadequate identification of high-risk parameters for surgery, and disregard of preoperative conservative measures. (7).

There are a limited number of studies examining the effectiveness of physiotherapy and rehabilitation after failed lumbar spine surgery. We could only find one trial that included physiotherapy and rehabilitation with exercise in this group of patients (8). In our case, reportedly, our patient had 3 lumbar spinal operations and had a more complex surgical history. In addition to severe pain, our patient had severe neurological symptom such as drop foot. We believe that the more complex surgical history of our case and the high severity of the clinical symptoms increase the originality of our report.

In this case report, we presented the medical and surgical history, physiotherapy and rehabilitation program and clinical results of a patient with lumbar disc herniation who had undergone 3 spinal surgeries for LBP and developed drop foot. The effectiveness of physiotherapy and rehabilitation applied to this patient was evaluated.

METHODS

Case Presentation

A 64-year-old married man who was overweight, according to the body mass index classification of Menier's, diabetes

mellitus and hypertension comorbidity was diagnosed with lumbar disc herniation in December 2019. In November 2022, he underwent partial discectomy surgery with hemilaminectomy technique due to severe LBP. The patient had undergone L4-L5 fusion and decompression surgery on 1 February 2023 and revision surgery for the previous surgery on 5 February 2023. As a result, 3 lumbar surgical interventions were performed in a short period of 3 months. The main findings of the patient's lumbar region radiological imaging results between 30.12.2012 and 05.02.2023 are shown in Table 1. The patient's anamnesis revealed that his gait was adversely affected after three operations; he had a fear of falling while walking, and he walked by dragging his feet. However, the patient reported severe pain during the activity. Gait was characterized by exaggerated knee and hip flexion to maintain contact of the lower limb with the ground, and a drop foot was observed. He had a positive Laseque test and analgesic use 3 times a day. The patient was included in the physiotherapy and rehabilitation program on March 21, 2023. Pain assessment with Numeric Pain Scale before and after the program, range of motion of trunk, lower extremity and foot with universal goniometer, hip, knee, foot, ankle and big toe, muscle strength assessment with muscle strength manual muscle; The Oswestry Disability Questionnaire and Roland Morris Disability Questionnaire were used to determine the disability status due to LBP, the Short Form-36 Quality of Life Scale (SF-36) was used to evaluate the quality of life, and the Beck Depression Scale was used to evaluate the emotional status (9-16). The measurement results before and after rehabilitation are shown in Table 2.

Physiotherapy and Rehabilitation Program

The patient was included in the physiotherapy and rehabilitation program 3 weeks after the last surgery. Physiotherapy and rehabilitation were applied for twelve weeks, with two sessions per week, for an average of 60 minutes per session. Before starting the treatment, the patient was given basic information about the existing pathology without using a terminological language.

The first step of the treatment was myofascial release technique. Spinal stabilization exercises were started in the

first week by teaching isolated contractions of the transversus abdominus muscle and continued in different positions in combination with unilateral and contralateral movements of the upper and lower extremities (17). The therapist applied 10 repetitions of stretching for 30 seconds to the shortened Quadratus Lumborum, Piriformis hip flexors, and lumbar extensor muscles. For the drop foot problem, which is one of the main clinical symptoms of the patient, the patient progressed from passive dorsiflexion range of motion exercises performed entirely by the therapist to active

assistive dorsiflexion movement, and finally to active dorsiflexion movement. Sciatic nerve mobilization was started in the second week of rehabilitation. Neuromuscular electrical stimulation of the tibialis anterior muscle Russian current was started in the third week. The treatment program continued with spinal stabilization exercises. At the end of the twelfth week, the exercises that the patient should do within the scope of the home program were reviewed, and necessary arrangements were made.

Table 1. Chronological radiological reports and images of the patient

MRI

12.30.2022

Before partial discectomy + hemilaminectomy (before 1st surgery)

1.surgery date: 1.6.2023

Bulging at the L4-L5 level

L5 nerve root compression. Bilaterally narrowed neural foramen

Diffuse bulging at the L5-S1 level



MRI

1.31.2023

One month after first surgery (partial discectomy + hemilaminectomy surgery)

Hemilaminectomy defect in the right half at the L5 level.

Oedematous changes secondary to oedematous operation in the skin, subcutaneous, paraspinal muscles and epidural space at the level of operation

Disc protrusion at L4-5 level and left foraminal disc protrusion, right disc extrusion

Neural foraminal stenosis, central disc protrusion with bulging at L5-S1 level

Tekal sac compression



X-RAY**2.2.2023****1 day after 2nd surgery
(Anterior Decompression and L4-5 Fusion
Surgery)***2nd surgery date: 2.1.2023***CT****3.10.2023****After revision of anterior decompression and
L4-5 fusion***3rd surgery date: 2.5.2023*

Posterior fixation material with metallic screws extending from both peduncles of L4 and L5 vertebrae to their corpus.
Right central **posterior extrusion at the level of L4-5**, **compression of thecal sac**

Broad-based posterior **protrusion of the L5-S1 disc**

**MRI****2.11.2024****1 year after the last surgery**

Broad-based posterior **protrusion of the L4-5 disc** suggests **partial laminectomy** on the left at this level

Bulging of the S1 disc



MRI: Magnetic Resonance Imaging, **CT:** Computed Tomography

RESULTS

Improvements were noted in the severity of the drop foot, the level of pain during activity, particularly in the active range of motion of lumbar flexion, extension and hip flexion, and in the muscle strength of the lower extremities, with right dorsal flexion being the most prominent. Pain during activity decreased from 8 to 4 on the numerical pain scale. Oswestry disability index score decreased from 23% to 16%. Additionally, the Rolland Morris questionnaire score decreased from 18 to 8. In addition, improvements were reported in the SF-36 physical function sub-parameter scores. Finally, the daily use of anesthetics was discontinued (Table 2). Physiotherapy and rehabilitation showed improvement in pain severity, range of motion of the trunk and lower extremities, muscle strength, and disability levels in a patient who developed drop foot after repeated unsuccessful lumbar spinal surgery in a very short period of time.

DISCUSSION

We revealed the effects of physiotherapy and rehabilitation in a patient who developed drop foot after repeated lumbar spinal surgeries due to lumbar radiculopathy. One of the most striking points in the case history is not only the 3 spine operations, but also the fact that these operations were

performed in a very short period of one month. Such a history of repeated spinal surgery is extremely rare.

As a result of the physiotherapy and rehabilitation program in our case, improvements were noted in drop foot severity and pain level during activity. In addition, significant positive changes were reported in the Ostwerty Disability Index, Roland Morris Disability Questionnaire, and SF 36 physical function sub-parameter scores. Finally, the daily use of anesthetic medication was eliminated.

Although radiculopathy persisted on radiology reports and images after surgery, physiotherapy and rehabilitation with active patient participation had a positive effect on the patient's clinical symptoms. Spinal stabilization exercises may minimize contact with nerve structures during activation by limiting undesired translatory movement of the lumbar vertebrae, especially forward and backward. (18). This stabilizing effect may be an important factor in the reduction of pain. However, it has been reported in various studies that radiculopathies are accompanied by severe muscle spasms (19). Approaches to relaxation of the Quadratus Lumborum muscle applied to the back may be another factor that reduces the symptoms of radiculopathy, including pain. Neuromuscular electrical stimulation is known to activate muscle fibers to a much greater extent than voluntary muscle contraction (20).

Table 2. Pain Severity, Low Back Pain Disability Status, Quality of Life and Analgesic Use Levels Before and After Treatment

	Before Treatment	After Treatment
Numeric Pain Scale (Rest/Night-Activity)	0/8	0/4
Oswestry Disability Index	23%	16%
Roland Morris Disability Questionnaire	18	8
SF-36 (Physical Health)	85	85
SF-36 (Physical Function)	45	85
SF-36 (Emotional Problems)	50	50
SF-36 (Energy/Fatigue)	60	70
SF-36 (Emotional Status)	85	88
SF-36 (Social Function)	60	60
SF-36 (Pain)	70	70
SF-36 (General Health)	70	70
Beck Depression Inventory	2	2
Analgesic Use (tablets/day)	3	0

There are very limited publications on physiotherapy applications after failed lumbar surgeries. Chu et al. reported a 48% partial recovery and 42% recurrence rate after spinal manipulation and mechanical traction in 31 patients with failed lumbar spinal surgery history (21). However, this study differs from our case report in that it included patients with a single history of failed surgery and included a non-exercise-based rehabilitation program. Although there are differences with our case in terms of the young age of the patient and a single failed surgery, this case report is in line with our results in terms of the positive effects of active exercises on pain and disability levels.

We had some limitations. Using the video camera-assisted force plate gait analysis system could have given us valuable results to compare before and after treatment. In order to more clearly demonstrate the effectiveness of the treatment of foot drop, performing an electromyographic evaluation to determine the peroneal nerve conduction velocity would have improved the quality of our report.

CONCLUSION

Patients with repeated unsuccessful lumbar surgery may present with clinical symptoms of high severity. It has been determined that the physiotherapy and rehabilitation program we implemented is effective. For these patients, the choice of physiotherapy and rehabilitation that involves the active participation of the patient before treatment approaches with different side effects and a certain risk ratio seems to be a more reasonable option, both in terms of patient safety and treatment efficacy.

Acknowledgment: None.

Author Contributions: GS, HSE: Conceptualization, Methodology, Formal Analysis, Investigation, Writing-Original Draft. GS, HSE: Conceptualization, Writing-Review & Editing, Supervision

Financial Support: None.

Conflict of Interest: None.

How to cite this article: Soyly G, Kılınc HE. Effectiveness of Physiotherapy Patient with Repeated Failed Spinal Surgeries. Journal of Hacettepe University Physical Therapy and Rehabilitation. 2024;2(1), 14-20.

REFERENCES

1. Abas Ah, Daud A, Mohd Hairon S, Shafei Mn. Prevalence And Risk Factors Of Low Back Pain In Malaysia: A Scoping Review. *Malays J Med Sci.* 2023;30(3):32-41.
2. Calais-Ferreira L, Pozzobon D, Pinheiro Mb, Blyth Fm, Ordonana Jr, Duncan Ge, Et Al. Sex Differences In Lifetime Prevalence Of Low Back Pain: A Multinational Study Of Opposite-Sex Twin Pairs. *Eur J Pain.* 2023;27(10):1150-60.
3. Ferreira Ml, De Luca K, Haile Lm, Steinmetz Jd, Culbreth Gt, Cross M, Et Al. Global, Regional, And National Burden Of Low Back Pain, 1990–2020, Its Attributable Risk Factors, And Projections To 2050: A Systematic Analysis Of The Global Burden Of Disease Study 2021. *The Lancet Rheumatology.* 2023;5(6):E316-E29.
4. Kobayashi K, Sato K, Kato F, Kanemura T, Yoshihara H, Sakai Y, Et Al. Trends In The Numbers Of Spine Surgeries And Spine Surgeons Over The Past 15 Years. *Nagoya J Med Sci.* 2022;84(1):155-62.
5. Thomson S. Failed Back Surgery Syndrome - Definition, Epidemiology And Demographics. *Br J Pain.* 2013;7(1):56-9.
6. Classification Of Chronic Pain. Descriptions Of Chronic Pain Syndromes And Definitions Of Pain Terms. Prepared By The International Association For The Study Of Pain, Subcommittee On Taxonomy. *Pain Suppl.* 1986;3:S1-226.
7. Baber Z, Erdek Ma. Failed Back Surgery Syndrome: Current Perspectives. *J Pain Res.* 2016;9:979-87.
8. Fortner Mo, Woodham Tj, Haas Jw, Oakley Pa, Harrison De. Failed Back Surgery Syndrome Successfully Ameliorated With Chiropractic Biophysics((R)) Structural Rehabilitation Improving Pain, Disability As Well As Sagittal And Coronal Balance: A Chiropractic Biophysics((R)) Case Report With A 6 Year Follow-Up. *J Phys Ther Sci.* 2024;36(1):44-50.
9. Devillé Wl, Van Der Windt Da, Dzaferagic A, Bezemer P, Bouter Lm. The Test Of Lasegue: Systematic Review Of The Accuracy In Diagnosing Herniated Discs. *Spine.* 2000;25(9):1140-7.
10. Jamshidi N, Rostami M, Najarian S, Menhaj Mb, Saadatnia M, Salami F. Assessment Of Ground Reaction Forces Of Steppage Gait In Comparison With Normal Gait. *Journal Of Musculoskeletal Research.* 2009;12(01):45-52.
11. Yakut E, Düger T, Öksüz Ç, Yörükkan S, Üreten K, Turan D, Et Al. Validation Of The Turkish Version Of The Oswestry Disability Index For Patients With Low Back Pain. *Spine.* 2004;29(5):581-5.
12. Roland M, Fairbank J. The Roland–Morris Disability Questionnaire And The Oswestry Disability Questionnaire. *Spine.* 2000;25(24):3115-24.
13. Küçükdeveci Aa, Tennant A, Elhan Ah, Niyazoglu H. Validation Of The Turkish Version Of The Roland-Morris Disability Questionnaire For Use In Low Back Pain. *Spine.* 2001;26(24):2738-43.
14. Instrument Ware Jr J, Sherbourne C. The Mos 36-Item Short-Form Health Survey (Sf-36): I. Conceptual Framework And Item Selection. *Medical Care.* 1992;30(6):473-83.
15. Kocyigit H. Reliability And Validity Of The Turkish Version Of Short Form-36 (Sf-36): A Study In A Group Of Patients Will Rheumatic Diseases. *Turk J Drugs Ther.* 1999;12:102-6.
16. Beck At, Ward Ch, Mendelson M, Mock J, Erbaugh J. An Inventory For Measuring Depression. *Archives Of General Psychiatry.* 1961;4(6):561-71.

17. Akuthota V, Ferreiro A, Moore T, Fredericson M. Core Stability Exercise Principles. *Current Sports Medicine Reports*. 2008;7(1):39-44.
18. Park Hs, Park Sw, Oh Jk. Effect Of Adding Abdominal Bracing To Spinal Stabilization Exercise On Lumbar Lordosis Angle, Extensor Strength, Pain, And Function In Patients With Non-Specific Chronic Low Back Pain: A Prospective Randomized Pilot Study. *Medicine (Baltimore)*. 2023;102(41):E35476.
19. Watts C. Syndrome Of Intradiscal Lumbar Herniation. Clinical Presentation And Management. *Surg Neurol*. 1988;30(4):263-7.
20. Yavuzer G, Geler-Kulcu D, Sonel-Tur B, Kutlay S, Ergin S, Stam Hj. Neuromuscular Electric Stimulation Effect On Lower-Extremity Motor Recovery And Gait Kinematics Of Patients With Stroke: A Randomized Controlled Trial. *Arch Phys Med Rehabil*. 2006;87(4):536-40.
21. Chu Ec, Trager Rj. Effectiveness Of Multimodal Chiropractic Care Featuring Spinal Manipulation For Persistent Spinal Pain Syndrome Following Lumbar Spine Surgery: Retrospective Chart Review Of 31 Adults In Hong Kong. *Med Sci Monit*. 2022;28:E937640.