

CASE REPORT

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Otago Home Exercise Program along with other physiotherapy interventions for the management of prolapsed intervertebral disc and its associated symptoms in an elderly: a case report

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Abstract

Prolapsed intervertebral disc or herniated disc (PIVD) is a common cause of back pain between the ages of 30 and 50 years. But, in the elderly PIVD is associated with associated symptoms whose management is often ignored. We reported a case of an 85 years old male patient with existing symptoms of PIVD for the last 5 years. However, the patient has never gone for physiotherapy treatment for the past 5 years due to unawareness and ignorance of the same. Since it was a geriatric case, the patient presented with associated symptoms along with PIVD. We tried to focus on the associated symptoms of the patient as well along with PIVD like fall risk and balance. The intervention program constituted 3 weeks of physiotherapy intervention focusing on pain management, strength conditioning, and balance training followed by an Otago Home Exercise Program.

Keywords Prolapsed intervertebral disc, Physiotherapy, Otago Home Exercise Program, Pro-Kin (tecnobody)

Introduction

The prolapsed intervertebral disc (PIVD) or herniated disc is a condition where the posterior longitudinal ligament gives way and disc material shifts into the spinal canal. The cause of giving away of the posterior longitudinal ligament may be due to vertical spinal instability which is the result of posture and related wear and tear or due to acute stretch related to sudden exertion or bending [1]. It is more prevalent in males between the age group of 30–50 years. It can occur at any spinal level but most frequently it is seen in lumbar spinal levels L4–L5, and L5–S1 [2]. Herniation and inflammation of the disc

put pressure on the traversing spinal nerve which can cause radicular symptoms. The degree of alternative disc degeneration increases the chance of lower back pain [2, 3]. Poor posture, prolonged sitting, poor lifting technique, obesity, pregnancy, and falls from height are the predisposing factors of PIVD. Due to the consequence of PIVD, there may be a chance of poor balance and a higher chance of dependency in the geriatric population [4, 5]. A wide range of physiotherapeutic practices are used to treat PIVD symptoms drastically but there is a lack of studies focusing on physical therapy management of PIVD in the geriatric population with co-morbidities. In this case study, we carried out symptomatic management of a geriatric PIVD case.

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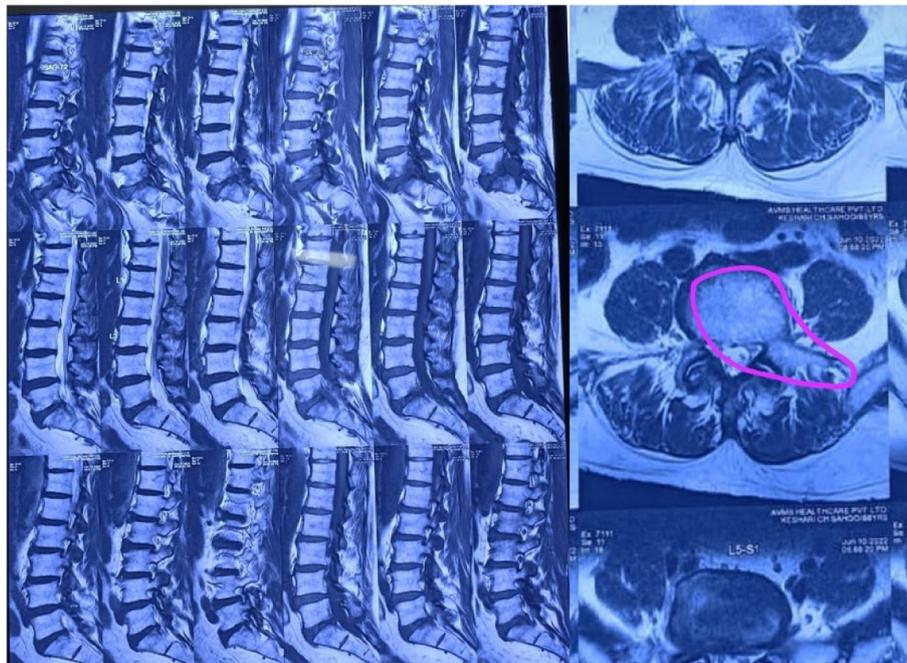


Fig. 1 MRI of the lumbar spine showing protrusion

Case presentation

An 85-year-old male patient came to Abhinav Bindra Sports Medicine and Research Institute with complaints of severe lower back pain over the last 15 days radiating to the bilateral lower limb (left > right) and having difficulty in prolonged sitting. He was all right 5 years ago, suddenly during lifting a heavy weight, he felt pain in the lower back region which progressed gradually over the last 1 year, and for the past 15 days, the pain has been increased in intensity. The patient has had a history of type 2 diabetes mellitus for the past 20 years and is on regular medications for the same. The patient is also having a history of myocardial infarction 15 years back and CABG had been done for the same during that period. He had gone angioplasty for the same, 2 years back and is on medication for the same. On observation, the patient's body type was ectomorphic and his posture assessment showed forward head posture, trunk side flexed to the right side, asymmetry in the anterior superior iliac spine (ASIS) (left side is elevated as compared to right), and anterior pelvic tilt. On palpation, we found spasm was present over the paraspinal muscles and tenderness was elicited in the right gluteal area (grade 2). Appetite and bowel bladder control were normal. There was no history of recent trauma, loss of appetite, night sweats, and weight loss. The patient had a complaint of a disturbed sleep cycle due to pain. Pain evaluation revealed that the onset of pain was gradual, pin-pricking in nature, aggravated during prolonged sitting, coughing, sneezing, and

squatting, and relieved on rest, and after taking medication. The Numerical Pain Rating Scale (NPRS) score on the day of assessment was 7/10. X-ray investigation of the bilateral hip joint was done 1 month ago after the advice of the physician which revealed osteophytes along bilateral acetabular margins confirming grade 1 osteoarthritis of the bilateral hip joint. MRI investigation had been done for the whole spine (Figs. 1 and 2), which showed mild posterolateral disc herniation at the C5–C8 level in the cervical region and protrusion at the L4–S1 level confirming a case of L4–L5, L5–S1 PIVD.

A general examination revealed that the patient was oriented with time, place, and person. Vitals signs were within normal limits along with chest symmetry. NPRS was 7/10 at sitting and 3/10 at rest. On the range of motion evaluation, the end range of flexion, left side flexion and rotation range of the lumbar spine was limited. The combined movement examination of flexion with left-side rotation produced a tingling sensation in the leg, but the combined movement of flexion and right-side rotation did not produce any symptoms [6]. The lower limb range of motion was full and free. On Manual Muscle testing evaluation, the muscle strength of both lower limbs was found to be 3/5. Sensations were intact in both lower limbs and lower limb reflexes were normal. L4 and L5 myotomes of the left lower limb showed a strength of 3/5. As the patient had a history of bilateral hip osteoarthritis, we conducted a balance and fall risk assessment. For balance assessment,

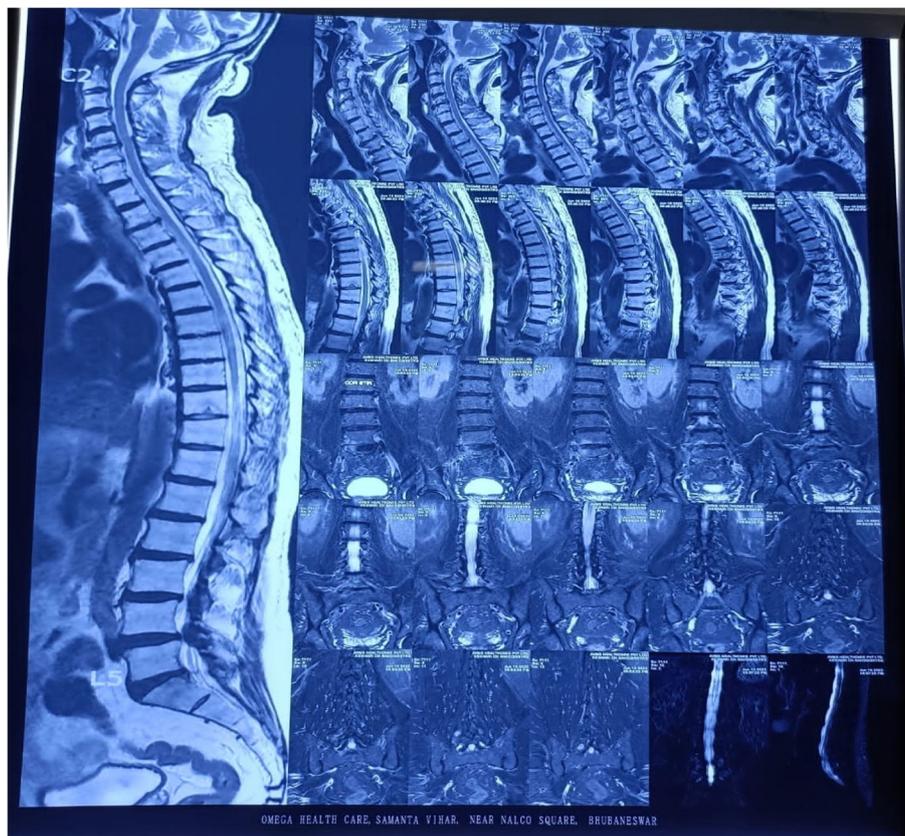


Fig. 2 MRI of the whole spine

we used the Berg balance scale (47/56) and Pro-kin system 252 (Tecnobody, Bergomo, Italy, which is a computerized proprioceptive stabilometric assessment system). Berg balance was used as a part of fall risk assessment and Pro-Kin assessed the limits of stability and balance on bipedal stance [7]. Neurological examination showed a positive left SLR (straight leg raise) test at 70° of elevation, Schober's test and the Slump test (left) were also found to be positive. On Functional Evaluation, patient's FIM (Functional Independence Measure), self-care component score was 18 (moderately dependent) for his ADLs.

From the above clinical findings and co-relating them with MRI reports, we concluded this as a case of PIVD with additional comorbidities like fall risk and balance deficits.

According to these symptoms and clinical findings, we planned phase-wise physiotherapy management of the patient, wherein in weeks 1–2 we focused on reducing the pain of the patient, progressing to strength training and ROM exercises, and week 3 focused on balance training and fall risk prevention leading to home exercise program from week 4 to week 5. After 2 weeks of continuing

the home exercise program, we conducted a follow-up assessment of the patient.

Physiotherapeutic intervention

Week 1–2

In the first 2 weeks, our main goal was to reduce pain and prevent the recurrence of symptoms, so for that, we started symptomatic management of the same. For pain reduction, Conventional Transcutaneous Electrical Nerve Stimulation (TENS) was given for 15 min [8]. Lumbar Traction- intermittent mode 15-s hold 5-s rest for 10 min was administered to reduce radiating pain and to increase the space between intervertebral discs [9]. To maintain mobility, ROM exercises were given. Correction of lateral shifting was done by McKenzie's lateral shifting correction technique. To improve flexibility stretching of the hamstring [10], piriformis, and plantar flexors were given (3 sets of 30-s hold interspersed with 10-s rest intervals). On the day of assessment, the pain was in the left gluteal area but during the treatment session, the subject complains right side more painful. Therefore, ischemic compression [11] on the right gluteal area (90 s), ultrasound [12] pulse mode 1:4, 0.8 w/cm²

for 8 min on the right gluteal tender area, and myofascial release [13] of gluteus maximus of the right side were given. MRI investigation also revealed a slight protrusion of the cervical C5–C6 vertebral disc without any symptoms so we initiated manual traction with movement in the cervical spine to prevent the occurrence of symptoms in the future.

Week 3

In the third week, NPRS was 4 so our main goal was to improve range of motion, and strength, reduce fall risk and improve balance. So gentle active movement of the lumbar spine was given to maintain ROM, and to maintain strength isometric lumbar stabilization exercises were implemented (roll a towel and place it below the lumbar spine with patient in supine lying and ask the patient to compress the towel using the lumbar extensors) [14] for 3 sets 10 s hold 5-s rest for 10 repetitions. Single-limb standing with support was initiated to improve balance in tandem walking. To improve lower limb strength, heel raises and wall squats were initiated. These close kinetic chain exercises have been shown to improve muscle and functional performance [15].

Home exercise program

After 3 weeks, we observed the pain intensity of the patient had been reduced. So, we started preparing the patient for a home exercise program. Otago Home Exercise Program had been taught to the patient. Risk factors for falls have been taught to the caregivers and the patient is also asked to do core-strengthening and ROM exercises at home. We continued lumbar traction and TENS till the end of week 3 after that patient is advised to continue the home exercise program for 2 weeks.

Follow-up

Follow-up assessment was taken after 2 weeks of continuing the home exercise program.

Results and discussion

From Table 1, it is clear that there was a significant improvement in pain score, muscle strength, balance, and FIM score post-treatment and after 1 month of follow-up. Otago Home Exercise Program showed a significant improvement in limits of stability, especially. There are several case reports done on PIVD but this is a case of PIVD in an elderly individual with several comorbidities where with symptomatic management we mainly focused on some other aspects of geriatric rehabilitation which involved reducing the risk of falls, improving balance which was not done in another case report [16, 17]. Unfortunately, the patient did not avail of physical therapy at the right time which has led to the worsening

Table 1 Pre-post and follow-up score of the case for pain, muscle strength, balance, limits of stability, and ADLs

	Pre	Post (3 weeks)	Follow-up
NPRS	7/10	4/10	2/10
Muscle strength			
Lumbar extensor	3/5	4/5	4+/5
Left side flexor	3/5	4/5	4+/5
Left rotator	3/5	4/5	4+/5
Berg balance scale	47/56	49/56	51/56
Limit of stability	Poor	Average	Good
Balance bipedal stance	Average	Good	Good
FIM (self-care)	18	21	24

of the condition. Therefore, more awareness about early treatment is required among the population. Otago Home Exercise Program is a good tool for fall risk management in the elderly [18] but there are very few studies showing its clinical implications in geriatric cases with PIVD. There are few studies [9, 16] that showed the effectiveness of TENS, traction, and strengthening exercises for the management of PIVD but very few case studies focused on the maintenance of strength and incorporating a home exercise program. Ours is the first case study that included the Otago Home Exercise Program for the management of PIVD. However, further studies are needed to come up with a precise physiotherapy intervention for PIVD in the geriatric population taking into consideration of all the associated problems.

Conclusion

The patient responded well to the symptomatic management and physiotherapeutic intervention resulting in reduced pain, improved strength, and reduced risk of falls. Therefore, the Otago Home Exercise Program along with other physiotherapy interventions for the management of prolapsed intervertebral disc can be beneficial for geriatric cases to improve co-morbidities such as balance and risk of falls.

Abbreviations

PIVD	Prolapsed intervertebral disc
ASIS	Anterior superior iliac spine
MRI	Magnetic resonance imaging
TENS	Transcutaneous electrical stimulation
ADLs	Activities of daily living
FIM	Functional independence measure
NPRS	Numerical pain rating scale

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Authors' contributions

We affirm that the submission represents an original work that has not been published previously and is not currently being considered by another journal. Also, we confirm that each author has seen and approved the contents of the submitted manuscript. This work was carried out in collaboration with all authors. SC designed the study, wrote the protocol, and wrote the first draft of the manuscript. TJ and CM managed the data collection for the study. All authors read and approved the final manuscript.

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Availability of data and materials

The data collected and/or analyzed during the study are available from the corresponding author on reasonable request.

Declarations**Ethics approval and consent to participate**

The study was done at Abhinav Bindra Sports Medicine and Research Institute, Bhubaneswar. Prior to this study ethical clearance was taken from the ethical committee of the institute and consent was taken from the patient. The study is not a clinical trial, so no clinical trial registration has been done. Prior to the start of the study, each procedure has been explained to the patient, and written consent has been taken for the same.

Consent for publication

The informed written consent form was signed by the patient before participation in the study and agreed to the publication of the treatment results.

Competing interests

The authors declare that they have no competing interests.

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