



A CASE STUDY ON PHYSIOTHERAPY MANAGEMENT IN LUMBAR HERNIATION WITH RADICULOPATHY

DR. NIDHI AGARWAL
ASSITANT PROFESSOR
RAMA UNIVERSITY

XYZ", was a 30-year-old who presented with a **three-month history of low back pain and more recently right leg pain**. XYZ was referred from the Emergency department to Outpatient Physiotherapy. She had **presented to ED on six occasions** since May for worsening pain.

MECHANISM OF INJURY

She **couldn't recall a single event relating to the onset of her back pain**. In the weeks prior to developing back pain she had been working casually as a waitress and did find bending over tables a strain. The pain began in her lower back quite centrally and with time is starting radiating straight down the back of her right thigh and into her calf, stopping at the ankle.

CURRENT SYMPTOMS

- **Worse in the morning**. She feels stiff and crooked in the am, is unable to get out of bed without assistance (from friend), and requires help to shower and dress.
- Waking in the night **every 2-3 hours** with severe buttock and posterior thigh pain.
- Denies any pins and needles or numbness but her right leg has become heavy.

Aggravating/easing factors:

- Lying down, sitting down, being still or getting cold aggravated her back and leg pain.
- Pain levels increase within 30 minutes of each sustained posture and take up to 2 hours to ease (mostly through walking).

Investigations, medications & current treatment:

- Lumbar spine CT reported a L5 S1 disc protrusion with right S1 nerve root compression.
- Valium, Endone, Panadeine forte and Ibuprofen had been prescribed.

- XYZ also received three treatments from a private Osteopath consisting of lower back and buttock massage. Although it felt ok at the time, there was no sustained improvement in pain and function.

General health & social history:

- Her general health was unremarkable and there were **no other red flags** within the subjective assessment.
- She was working casually as a waitress, however had to quit her job due to worsening pain.
- As **she can't work**, XYZ wished to return home, however was **worried she wouldn't be able to travel back home** in her current pain state.
- XYZ expressed her concerns regarding her pain and the lack of improvement.

• SUBJECTIVE ASSESSMENT ANALYSIS

Following the subjective assessment my **primary hypothesis for the source of symptoms was a lumbar disc herniation with associated radiculopathy (LDHR)**. More specifically L5/S1 disc protrusion with right S1 nerve root compression (as per CT Scan results).

Reasoning for hypothesis is based on:

- Distribution of pain following the S1 **dermatome**.
- High pain severity of 10/10 in the leg and 6/10 in the back i.e. **worse distally**.
- Moderate irritability (no position of ease, takes 2 hours to settle slightly).
- **Strong inflammatory nature** to her morning pain and stiffness.

There is **no single feature that provides the diagnosis of lower limb radiculopathy** (often referred to as sciatica), but more research suggests a with a **combination of the following features** diagnosis of LDHR is more specific (Ford, Hahne, Chan, & Surkitt, 2012; Jacobs et al., 2011; Koes, Van Tulder, & Peul, 2007; Van der Windt, et al., 2010).

- **Distribution of symptoms**
 - Unilateral leg pain greater than low back pain.
 - Pain radiating in a dermatomal pattern, below the knee and into the foot or toes.
 - Numbness and paraesthesia in the same distribution,
- **Positive signs on neurodynamic and neurological examination**
 - Straight leg raising test induces more leg pain.
 - Neurological deficits which are limited to one nerve root.
- **Positive signs on MRI and CT imaging** of lumbar disc herniation resulting in nerve root compression

HYPOTHESIS TESTING

In order to prove primary hypothesis it was necessary to determine if there were positive signs on the straight leg raise test and neurological deficits on the physical examination.

The secondary hypothesis, which needed to be ruled out, was somatic referred pain, which could be implicated or disregarded following the neurological and physical examination (Van der Windt, et al., 2010).

PHYSICAL EXAMINATION

Observation of posture and function:

- The first thing I noticed was the way XYZ stood.
- In standing, her **shoulders were shunted to the left side, her back was extended and pelvis anteriorly tilted, and there was visible hyper-tonicity of the lumbar para-spinal muscles.**

This shunted **antalgic posture** is commonly referred to as a lumbar list. Observation of a lumbar list unfortunately is a test lacking in reliability (Clare, Adams, & Maher, 2003). Maitland (2005), however, teaches us that **if a person presents with an observable postural deformity, they are going to be more challenging to get better.** In XYZ case, she had a **contralateral list (shoulders listed to the opposite side of back/leg pain)**, which is thought to respond more favourably to treatment than an ipsilateral list.

In my experience antalgic postures are very important to detect because they indicate a protective position; mechanism which the body is adopting (often subconsciously) in the acute phase of injury to protect the injury, and if the antalgic posture is not carefully examined and carefully corrected, it can make the patient a lot worse.

Active range of movement:

- Lumbar flexion P2 (right-sided low back pain) R` (upper thigh).
- Extension P2 (right buttock and leg pain) R` (vertical).
- Other movements were not assessed day 1 due to severity and irritability.

Neurological examination:

- Weak single leg calf raise (SLCR) and was only able to perform three assisted raises to 50% range. Gr 5 strength of right leg SLCR x5 repetitions.
- Myotomal weakness was absent.
- The S1 reflex on the right side was absent, with other lower limb reflexes being preserved.
- No sensory changes were noted.

Neurodynamic examination:

- The *straight leg raise test (SLR)* was positive in reproducing XYZ posterior thigh pain and limited at 20 degrees on the right side.
- Her left SLR was limited by hamstring tightness at 50 degrees.

Manual palpation:

- Palpation was conducted in the left side lying position with pressure applied only to the onset of pain (P1).
- The presence of generalised hyperalgesia made it difficult to establish a comparable finding day 1.

ANALYSIS OF PHYSICAL EXAMINATION & PRIMARY HYPOTHESIS

The hypothesis of L5/S1 lumbar disc herniation with associated S1 radiculopathy was **accepted**, based on:

1. Presence of pain distribution along the S1 dermatome,
2. Absent S1 reflex,
3. Weakness of the S1 myotome,
4. Positive right sided SLR,
5. and correlation between these physical findings and the results of the lumbar CT scan.

TREATMENT**Day 1 treatment:**

- List correction with left side gliding exercises in standing.
- This was indicated during the physical exam as an effective pain reducing technique.
- The result of this treatment was reduced LBP and increased AROM, and less pain with walking.

Directional preference mechanical loading strategies (MLS) have been derived from the **McKenzie method** and are a common approach implemented in the treatment of discogenic low back pain (Ford, Surkitt, & Hahne, 2011). The key feature of using MLS in assessment and treatment is the *centralisation phenomenon*, i.e. abolishment of distal symptoms as a result of repeated movements of the lumbar spine. Applying this principle of MLS, I chose left side glide as my direction of treatment as it resulted in centralisation of XYZ's leg pain.

Often I explain to patients "the injury you have will heal quicker if we can find a way to get you to move frequently and move without too much pain". From here I assess side gliding (and its normally only one direction to start) and will use list correction as a treatment if there is a favourable outcome from the treatment. Using this movement to show patients that **they can manage their pain**, that **movement is satisfactory**.

Taping was used as a second treatment day 1. This was justified as a means of maintaining the improved spinal position, reducing load through the disc and ultimately reducing inflammation (Ford, et al., 2012; Ford, et al., 2011).

If there is a movement direction that is particularly painful, I try to limit that movement on the first day. So, move into the direction that feels good and try stay away from provoking pain in the movement that hurts more.

Taping in a criss-cross overlap with help reduce muscle activation across the lower back.

Taping with vertical strips will block lumbar flexion

Advice

- To avoid prolonged bed rest and sitting, & to go for regular small walks to help manage the stiffness.
- Education for the expected timeframes for recovery (months) and likely prognosis (determined by progress and reassessment Day 2/3) to enhance self-management and to reduce the likelihood of re-aggravation.

The use of **three different treatment** strategies for the first treatment can be justified by:

- The chronic nature of the pain,
- Worsening symptoms,
- Lack of response to previous treatment
- The patient's poor understanding of the problem.

DAY 2 ASSESSMENT AND TREATMENT

SUBJECTIVE ASSESSMENT

- Reported improvement in LBP with back pain 4/10 and leg pain 7/10 (almost 30% improvement).
- Am stiffness continued but Sally was able to independently get out of bed and move around.
- No symptoms of leg heaviness.

PHYSICAL EXAMINATION

- The following physical asterisks were re-assessed:
 - Contralateral lumbar list in standing – improved but still remained (slightly),
 - Lumbar AROM – Flex P2(right LBP) R(mid thigh) and extension P2(Right LBP) R(10 degrees).
- **New assessment – Motor control of Transversus Abdominus (TrA).**

- Based on the fact that taping helped to increase the sense of stability around the lumbar region, I was interested to explore if activation of stabilising muscles could produce the same treatment effect.
- This was assessed in standing, with the addition of TrA activation prior to, and throughout lumbar active movements and in supine as a variation of the active straight leg raise test.
- In both position XYZ reported **increased pain following activation of these muscles**. This assessment was then **abandoned. Not because it was wrong but because** it provided no route for new treatment on day 2 . It may be re-visited in subsequent treatment sessions.
- **Second new area of assessment - Lumbar passive physiological intervertebral movements (PPIVMS).**
 - Assessment revealed a deficit in rotation movement between L5 and S1 segments on the right side, limited by pain.
 - This was treated with Gr III- rotation mobilisations at 30-second intervals.
 - On reassessment, there was a reduction in pain at 10 degrees of lumbar extension AROM and reduction of thigh pain with walking.
- As XYZ had improved, **day 1 treatment was repeated with review of the list correction exercise and re-application of a the lumbar tape.**

CONCLUSION

- The primary hypothesis of lumbar disc herniation with associated radiculopathy needs to be supported by a combination of physical examination findings, and correlate with the results of MRI or CT scan.
- If XYZ condition deteriorated, she has enough signs of compressive radiculopathy to warrant a neurosurgical review.
- Following the initial phase of treatment and resolution of the lumbar list, a functional restoration program is likely to be with most relevant treatment approach for this problem.
- Given the improvement shown within the first two sessions, and in light of the evidence, XYZ will likely have a good prognosis for recovery, and in the long-term regain her pre-morbid level of function.

REFERENCE

- 1.)Boyd, B. S., & Villa, P. S. (2012). Normal inter-limb differences during the straight leg raise neurodynamic test: a cross sectional study. *BMC musculoskeletal disorders*, 13(1), 245.
- 2.)Clare, H., Adams, R., & Maher, C. (2003). Reliability of detection of lumbar lateral shift. *Journal of manipulative and physiological therapeutics*, 26(8), 476-480.
- 3.)Devillé, W., van der Windt, D., Dzaferagic, A., Bezemer, P., & Bouter, L. (2000). The test of Lasegue: systematic review of the accuracy in diagnosing herniated discs. *Spine*, 25(9), 1140-1147.
- 4.)Ford, J. J., & Hahne, A. J. (2013). Pathoanatomy and classification of low back disorders. *Manual therapy*, 18(2), 165-168.

- 5.)Ford, J. J., Hahne, A. J., Chan, A., & Surkitt, L. D. (2012). A classification and treatment protocol for low back disorders Part 3-Functional restoration for intervertebral disc related disorders. *Physical Therapy Reviews*, 17(1), 55-75.
- 6.)Ford, J. J., Surkitt, S. L., & Hahne, A. J. (2011). A classification and treatment protocol for low back disorders Part 2-Directional preference management for reducible discogenic pain. *Physical Therapy Reviews*, 16(6), 423-437.
- 7.)Hahne, A., Ford, J., Surkitt, L., Richards, M., Chan, A., Thompson, S., et al. (2011). Specific treatment of problems of the spine (STOPS): design of a randomised controlled trial comparing specific physiotherapy versus advice for people with subacute low back disorders. *BMC musculoskeletal disorders*, 12(1), 104.
- 8.)Hahne, A. J., Ford, J. J., & McMeeken, J. M. (2010). Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review. *Spine*, 35(11), E488-E504.
- 9.)Jacobs, W. C., van Tulder, M., Arts, M., Rubinstein, S. M., van Middelkoop, M., Ostelo, R., et al. (2011). Surgery versus conservative management of sciatica due to a lumbar herniated disc: a systematic review. *European Spine Journal*, 20(4), 513-522.
- 10.)Jensen, M. C., Brant-Zawadzki, M. N., Obuchowski, N., Modic, M. T., Malkasian, D., & Ross, J. S. (1994). Magnetic resonance imaging of the lumbar spine in people without back pain. *New England Journal of Medicine*, 331(2), 69-73.
- 11.)Koes, B. W., Van Tulder, M. W., & Peul, W. C. (2007). Diagnosis and treatment of sciatica. *BMJ: British Medical Journal*, 334(7607), 1313.
- 12.)Maitland, G. D., Hengeveld, E., Banks, K., & English, K. (2005). *Maitland's vertebral manipulation*: Elsevier Butterworth-Heinemann Edinburg.
- 13.)Peul, W. C., Brand, R., Thomeer, R. T., & Koes, B. W. (2008). Improving prediction of “inevitable” surgery during non-surgical treatment of sciatica. *Pain*, 138(3), 571-576.
- 14.)Van der Windt, D. A., Simons, E., Riphagen, I. I., Ammendolia, C., Verhagen, A. P., Laslett, M., et al. (2010). Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain (Review). *Cochrane Database Syst Rev*, 2(2).

