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Effectiveness of Combined IRR and MFR Technique in A 38-Year Old Female with L4-L5 Pivd: A Case Report

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Abstract

Background

Overview of the condition: Prolapsed intervertebral disc PIVD is a common spinal disorder characterised by displacement of the nucleus pulposus through the annulus fibrosis leading to nerve root compression. It most frequently affects the lumbar region (especially L4-L5 and L5-S1) resulting in pain, radiculopathy and functional limitations.

Epidemiology: PIVD is highly common among individuals aged 30-50 years with increasing incidence due to sedentary lifestyles, poor posture. Lumbar disc prolapse accounts majority of cases. Female in middle age may be predisposed due to many factors such as reduced muscle strength, ergonomic challenges, hormonal factors.

Geographic condition: Geographic factors play a role in the development of PIVD. In developing regions like India, risk factors include :

-Prolonged sitting (desk jobs, driving, household chores)

-Poor ergonomics awareness

-Manual labour and improper lifting techniques

-Limited access to early physiotherapy care

Urban population tends to show higher incidence due to sedentary lifestyle, whereas rural populations may develop PIVD due to repetitive physical strain.

Technique of procedure: Management of PIVD can be either surgical or conservative, but mostly physiotherapy tends to be the first line treatment. Common physiotherapy techniques includes:

-Pain management : electrotherapy (TENS, IFT, ultrasound)

-Manual therapy: Joint mobilization, Soft tissue techniques

-Exercise therapy: strengthening exercise, stretching exercise, ROM exercise

-Postural correction and ergonomic training.

This intervention aim to reduce pain, improve ROM, and restore functional independence.

Scope of the study: This case study focuses on a PIVD involving lumbar (L4-L5) regions in a 38-year old female. This study highlights the effectiveness of a physiotherapy program in managing the pain, limited ROM. It highlights individualised management , functional recovery and avoidance of surgical intervention. The findings may contribute to clinical understandings and guide physiotherapists in managing similar complex cases.

Case description and assessment:

A 38-year-old female, homemaker, presented with complaints of low back pain. For the first 2 years, the patient experienced only low back pain. Subsequently, she developed a sudden locking sensation in posterior aspect of left thigh, accompanied by radiating, shooting nerve pain, which then prompted her to seek medical consultation. The pain is aggravated by prolonged sitting, household activities, and lifting her twin children. She reports difficulty in performing daily activities such as bending, lifting, prolonged standing.

There is no significant past history of trauma or major illness. Radiological investigations, including X-ray and MRI, revealed prolapsed intervertebral disc (PIVD) L4–L5 levels.

On observation, the patient demonstrated poor posture with reduced spinal alignment. Palpation includes tenderness over lumbar regions, gluteal trigger points in left hip. Range of motion (ROM) of the lumbar spine was restricted and painful, particularly in flexion. Manual Muscle Testing (MMT) showed mild weakness in the paraspinal and core muscles. These findings indicate functional limitations affecting her daily living activities, especially those involving childcare and household work.

Uniqueness of study:

This case study highlights a 38-year old female patient diagnosed with PIVD at the L4-L5 level, presenting with low back pain and radiating symptoms consistent with sciatica. While PIVD at this level is relatively common, the uniqueness of this case lies in integrated physiotherapy approach combining IRR (infrared radiation) and Myofascial release (MFR) which demonstrated significant and rapid pain relief.

Unlike conventional physiotherapy protocols that primarily focus on electrotherapy or exercise based rehabilitation alone, this study emphasizes a multimodal approach targeting both neural and myofascial components of pain. Another distinctive aspect is the early and noticeable reduction in radicular pain, suggesting that combining IRR(Infrared radiation) with MFR may have a synergist effect in managing both local and referred pain. This case is worth reporting as it supports the clinical relevance of integrating manual therapy with electrotherapy for enhanced outcomes in lumbar PIVD patients, especially in cases presenting with sciatica.

Physiotherapy technique, protocol and duration: The patient underwent a structured physiotherapy program for a duration of 4-5 days in a week for a month. Treatment protocol included :

- IRR (infrared radiation) applied over lumbar region, duration 10-15 minutes
- Myofascial release (MFR) on lumbar paraspinals, gluteal muscles, piriformis using IASTM tool, ischemic pressure.
- Stretching exercises (piriformis stretch, hamstring stretch)
- core strengthening exercise (bridging, cobra pose, cat and camel exercise)
- Isometric abdominal exercises

Outcome measures used: to evaluate patients progress, the following standardised outcome measures were used – VAS (visual analogue scale) for pain, SLR (straight leg raise) test for neural tension

Results:

Following integrated physiotherapy intervention, the patient demonstrated marked reduction in pain, improved functional ability and increased range of motion. The combination of IRR and MFR proved effective in both localised low back pain and radiating sciatic symptoms. The physiotherapy protocol helped in-

- Pain reduction (pain intensity reduced observed using VAS)
- Range of motion (Lumbar mobility improved significantly particularly in forward flexion. This improvement attributed to reduced muscle spasm and fascial restrictions following MFR)
- Muscle flexibility and strength (improved flexibility in hamstrings and piriformis muscles, reduction in muscle tightness, better core muscle activation)
- functional improvement (the patient progressed from severe functional limitation due to sciatica to enhanced ability to perform daily activities)

Outcome measures (pre vs post):

Parameter	Pre treatment	Post treatment
VAS (pain)	7/10	2/10
SLR (left)	50 degree	80 degree
Lumbar flexion	Limited	Near normal

Overall analysis:
The results indicate that the combined use of IRR and MFR produced a synergist therapeutic effect, leading to rapid pain relief, improved neural mobility (SLR), increased lumbar ROM, enhanced functional independence. The protocol was particularly effective in addressing both significant overall improvement.

Discussion
The present case study demonstrates that a combined physiotherapy approach using IRR (infrared radiation) and MFR (myofascial release) resulted in reduction in pain, improvement in lumbar ROM and enhanced functional ability in a patient with L4-L5 PIVD and sciatica.
Comparison with previous studies: The findings of this case are consistent with previous research that supports the effectiveness of electrotherapy and manual therapy in managing low back pain and sciatica--research on myofascial release highlights its role in reducing fascial tightness, improving tissue function, relieving nerve pressure.
-this study using combined therapy approach IRR+MFR have shown better outcomes compared to single modality treatments.
However most existing studies focus on generalised low back pain, whereas this case specifically emphasizes sciatica associated with PIVD, making it clinically more relevant.

Why this therapy was effective-
The success of this intervention can be attributed to the synergist effect of IRR and MFR. is a major contributor to discomfort, it also decreases muscle spasms in lower back, enhanced blood circulation, accelerated nerve repair. MFR addresses underlying myofascial restrictions, indirectly reduced compression on sciatic nerve, reduced muscle spasm in lumbar paraspinals, gluteal muscles, piriformis. Together these techniques targeted both neurological component (pain, nerve irritation) and musculoskeletal components (tightness, restricted mobility)

Clinical insights from this case-
Treating only the disc pathology may not be sufficient; myofascial components play a major role in pain persistence, combination therapy is more effective than isolated modalities, early integration of manual

therapy can accelerate recovery.

Study limitation-

Despite the positive outcomes, this case study has several limitations-

- small sample size (this study is based on a single patient, limiting generalise results)
- short duration and lack of long term followup
- limited outcome measures, only VAS, SLR test were used.

Conclusion

This case study highlights the effectiveness of an integrated physiotherapy approach in a 38 year old female patient with L4-L5 PIVD presenting with low back pain and sciatica. The treatment protocol included stretching of hamstring, piriformis & combination of IRR and MFR to address soft tissue restrictions. Following the interventions the patients showed improvement in pain levels, lumbar ROM, neural mobility, functional ability. The key message of this case is that a combined approach targeting both neural and myofascial components can lead to faster and more effective recovery in patients.

Future scope of study:

While this case demonstrated positive outcomes,further research can expand on these findings-

- Large sample size (future studies should include greater number of patients to improve the generalised and reliability of results)
- long term follow up (assessing patients over an extended period would help determine sustainability of treatment effects)
- comparative studies (comparing combined therapy IRR+MFR with other treatment approaches eg. Exercise alone, manual therapy alone, would provide stronger clinical evidence)
- use of advanced outcome measures (including objective tools such as gait analysis or imaging studies MRI followup to strengthen clinical findings)

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