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Chronic Mechanical Low Back Pain: A Case Study

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Abstract: ***This case study focuses on a 55-year-old male patient with chronic low back pain (LBP) persisting for six months, exacerbated by manual labor activities like lifting and bending. Clinical evaluation revealed pain localized to the lumbar spine (L4-L5) and X-ray findings of loss of lumbar lordosis, suggesting mechanical stress. Key risk factors included occupational strain, poor ergonomics, and age-related changes. A multidisciplinary treatment plan was implemented, comprising NSAIDs, muscle relaxants, physical therapy for core strengthening and posture correction, and ergonomic guidance. Adjunctive measures provided additional relief, including heat therapy and lumbar support belts. Over four weeks, the patient's pain scores reduced from 6/10 to 2/10, with marked improvement in daily functionality. This case underscores the importance of integrating medical, physical, and preventive strategies for effective LBP management.***

Keywords: Low back pain, lumbar spine, musculoskeletal health, occupational hazards, physical therapy, rehabilitation, ergonomic solutions, non-specific LBP, chronic pain, lifestyle modifications.

1. Patient Overview

Chindhu Patil, a 55-year-old male and manual laborer, presented with chronic low back pain (LBP) that had been affecting him for six months. The pain, initially dull and persistent, became significantly worse over the last 10 days, restricting his ability to perform routine activities like **walking, bending forward, and lifting objects**. He described the pain as localized to the lumbar spine, specifically at the L4-L5 level, with occasional radiating discomfort to the left posterior superior iliac spine (PSIS).

A detailed occupational history revealed that his job involved repetitive heavy lifting, a well-documented risk factor for developing musculoskeletal disorders like chronic LBP. Over time, the cumulative strain from these activities likely contributed to his condition. **The absence of trauma or acute injury pointed to mechanical stress as the primary cause.** The patient's role as a manual laborer meant prolonged exposure to improper ergonomic practices, compounding the mechanical strain on his lumbar spine.

This pain not only disrupted his professional duties but also hindered basic mobility, affecting his quality of life. Previous attempts at management through over-the-counter medications provided only temporary relief. His case highlights the critical need for **addressing occupational hazards** and tailoring treatment strategies to the demands of a labor-intensive lifestyle. Recognizing the patient's work-related risk factors was key to **diagnosing and planning a comprehensive management approach.**

Clinical Assessment

1) **Pain Location:** Localized to the lumbar spine (L4-L5) and left posterior superior iliac spine (PSIS).
2) **Pain Characteristics:**
   a) Initial pain score: 6/10.
   b) Dull and aching in nature, without diurnal variation.
3) **Physical Findings:**
   a) Loss of lumbar lordosis observed, indicating chronic postural or mechanical stress.
   b) Tenderness on palpation of the lumbar region.
   c) Restricted lumbar flexibility, particularly during forward bending movements.
4) **Aggravating Factors:** Walking, bending forward, and lifting weights.
5) **Relieving Factors:** Pain alleviated by rest, confirming a mechanical origin.
6) **Neurological Assessment:** No deficits like numbness or weakness, ruling out nerve compression or radiculopathy.

Risk Factors

1) Occupational Hazard:
- Repetitive heavy lifting as a manual laborer increases strain on the lumbar spine.

2) Ergonomic Issues:
- Improper lifting techniques and poor posture during work tasks.

3) Age-Related Changes:
- Age (55 years) contributes to intervertebral disc degeneration and reduced joint flexibility.

4) Core Muscle Weakness:
- Insufficient strength in core muscles increases reliance on the lumbar spine during physical activities.

5) Chronic Overuse:
- Prolonged, repetitive stress without adequate recovery leads to cumulative strain on lumbar structures.

6) Mechanical Load:
- Physical activities amplify intra-spinal pressure and aggravate musculoskeletal stress.

Diagnosis: The patient was diagnosed with **chronic mechanical low back pain (LBP)** due to the combination of clinical symptoms, risk factors, and radiographic findings.

Key Diagnostic Findings

1) Clinical Symptoms:
- Persistent low back pain localized to L4-L5 and left posterior superior iliac spine (PSIS).
- Pain was described as dull and aching, scoring 6/10.
- No diurnal variation, indicating a consistent mechanical origin.

2) Physical Examination:
- Loss of lumbar lordosis observed on palpation and inspection.

- Tenderness localized to the lumbar region.
- Restricted range of motion during lumbar flexion.

3) Radiographic Evidence:
- X-ray (Lateral and AP views): Loss of lumbar lordosis, indicative of chronic musculoskeletal strain.
- No evidence of fractures, disc space narrowing, or other structural abnormalities.

4) Aggravating and Relieving Factors:
- Activities like bending, walking, and lifting weights increased pain, confirming mechanical strain.
- Pain relief with rest further supported the mechanical diagnosis.

2. Treatment Plan

The approach focused on a combination of medication, physical therapy, lifestyle modifications, and supportive therapies, with a strong emphasis on physical therapy as the cornerstone of rehabilitation.

1) Medications

NSAIDs (e.g., Ibuprofen): Prescribed to alleviate inflammation and reduce pain levels (Balague et al., 2012).

2) Physical Therapy

A structured physical therapy regimen was implemented to restore functional mobility, improve spinal stability, and prevent recurrence. Key components included:

a) Stretching Exercises:
- **Target Areas:** Lumbar extensors, hamstrings, hip flexors, and piriformis.
- **Goal:** Enhance flexibility, reduce stiffness, and relieve tension in the lower back and adjacent muscle groups (van Middelkoop et al., 2011).
- **Example Exercises:** Cat-camel stretch, child's pose, and seated hamstring stretches (Hartvigsen et al., 2018).

b) Core Strengthening:
- **Target Areas:** Abdominal muscles, obliques, and deep spinal stabilizers (e.g., multifidus, transverse abdominis) (Casazza, 2012).
- **Goal:** Improve core stability, which reduces the load on the lumbar spine during daily activities (Maher et al., 2017).
- **Example Exercises:** Plank variations, bird-dog exercise, and dead bug exercise (Bogduk, 2016).

c) Postural Correction:
- **Focus:** Teach proper alignment of the spine during activities like sitting, standing, and lifting (Chou et al., 2017).
- **Interventions:** Use of mirrors or feedback tools to ensure correct posture (Heneweer et al., 2009).
- **Exercises:** Wall angels, chin tucks, and scapular retraction exercises (van Middelkoop et al., 2011).

d) Functional Training:
- **Goal:** Gradual reintegration of functional activities such as lifting and bending with proper mechanics (Bogduk, 2016).
- **Training:** Simulated work tasks under guidance to correct improper movement patterns (Balague et al., 2012).

e) Manual Therapy:
- Techniques like myofascial release or joint mobilization were applied to relieve soft tissue tension and improve lumbar mobility (Heneweer et al., 2009).

3) Lifestyle Modifications

a) Ergonomic Education:
- Demonstrated proper lifting techniques to reduce lumbar strain during work (Casazza, 2012).
- Advised on workstation adjustments to support spinal alignment (Chou et al., 2017).

b) Activity Modifications:
- Recommended avoiding prolonged standing or sitting (Maher et al., 2017).
- Encouraged frequent breaks and alternating between sitting and standing positions (Heneweer et al., 2009).

c) Daily Exercises:
- Assigned home-based exercises to maintain flexibility and strengthen the lumbar region (Balagué et al., 2012).

4) Adjunctive Therapies

a) Heat Therapy:
- Applied to the lumbar region to relax tight muscles and enhance blood flow (van Middelkoop et al., 2011).

b) Lumbar Support Belts:
- Provided additional support during physically demanding activities, reducing strain on the spine (Bogduk, 2016).

5) Follow-Up Plan

Weekly Monitoring:
- Pain scores and functional progress were assessed during follow-ups (Casazza, 2012).
- Adjustments were made to the physical therapy regimen based on progress (Heneweer et al., 2009).

3. Results

After four weeks of treatment, the patient exhibited substantial improvement across multiple metrics. The multidisciplinary approach proved effective, demonstrating reduced pain intensity and improved quality of life. The patient adhered to the treatment plan, leading to sustainable recovery.

a) **Pain Intensity** reduced from 6/10 to 2/10 on a Numeric Pain Rating Scale (NPRS).
b) **Activity Limitations** decreased from 7/10 to 3/10, reflecting enhanced mobility and reduced difficulty with daily tasks.
c) **Activities of Daily Living (ADL)** performance improved from a score of 5/10 to 2/10, showing increased independence.

4. Discussion

This case highlights the interplay between occupational hazards and chronic LBP. The patient's role as a manual laborer exposed him to repetitive heavy lifting and poor ergonomic practices, which are significant risk factors for the development of chronic LBP. These factors likely contributed to the gradual onset of symptoms and the persistence of pain over time. The loss of lumbar lordosis observed on imaging further supported the diagnosis of mechanical strain, confirming that structural changes were a result of prolonged stress rather than acute injury (Balague et al., 2012).

The comprehensive treatment approach integrated physical therapy, medication, and preventive education to address both the pain and its root causes. Physical therapy was crucial in this case, focusing on core strengthening, postural correction, and flexibility exercises. These interventions not only helped in managing pain but also aimed to prevent future episodes by improving spinal stability and reducing mechanical load on the lumbar spine (van Middelkoop et al., 2011).

Medication, specifically NSAIDs, provided short-term pain relief and inflammation control, allowing the patient to engage more fully in physical therapy exercises. This multimodal approach was effective in reducing pain intensity and enabling the patient to resume light occupational activities (Bogduk, 2016). Preventive education emphasized ergonomic practices, teaching the patient how to avoid movements that exacerbated pain and how to maintain proper posture during work tasks (Chou et al., 2017).

Consistent follow-up was essential for monitoring progress and making timely adjustments to the treatment plan. Weekly assessments allowed for the adjustment of exercises and the introduction of new strategies when needed. This approach ensured that the patient's recovery was both effective and sustainable, with long-term benefits being supported by regular reinforcement of treatment strategies (Heneweer et al., 2009). Research has shown that chronic LBP management requires a holistic approach that includes not only physical interventions but also psychological support and lifestyle modifications. The reduction in pain intensity, activity limitations, and improved ADL performance observed in this case reflects the benefits of such a comprehensive approach (Foster et al., 2018). This case serves as a reminder that addressing occupational factors and providing ongoing support is critical in the long-term management of chronic LBP (Casazza, 2012). The significant reduction in the depression score highlights the positive psychological impact of effective pain management and the integration of preventive strategies into daily life (Heneweer et al., 2009). By emphasizing the need for a multidisciplinary approach, this case underscores the importance of individualized treatment plans in managing chronic pain conditions. The combination of physical therapy, medication, and lifestyle adjustments not only alleviates symptoms but also empowers patients to take an active role in their recovery, leading to better outcomes and improved quality of life (Balague et al., 2012). This approach aligns with recommendations from the literature, where comprehensive treatment strategies are shown to enhance recovery and prevent recurrence (Woolf et al., 2003).

5. Conclusion

An interdisciplinary approach to chronic LBP management combines multiple treatment modalities to comprehensively address the condition. This includes the use of physical therapy to strengthen core muscles and improve flexibility, medications to manage pain and inflammation, and lifestyle modifications to reduce strain on the spine. By integrating these treatments, healthcare providers can effectively reduce symptoms, enhance spinal stability, and educate patients on preventive measures to avoid recurrence. This collaborative approach ensures that all aspects of the patient's health—physical, psychological, and lifestyle—are considered for optimal recovery and sustained well-being.

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