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Cervico-thoracic Mobilization to Address LBA for a Patient with Lumbar Spondylolisthesis

P P Mohanty[1], B Kuanar[2], B K Behera[3]

[1]Associate Professor, Head of the Department (PT), Swami Vivekananda National Institute of Rehabilitation Training and Research, Olatpur, Cuttack, Orissa, [2]Retired Professor & H.O.D, Department of Neurology, [3]Professor & H.O.D, Department of Orthopedics, SCB Medical College, Cuttack

ABSTRACT

Background and Purpose: This case report describes the examination, intervention and outcome of a patient with lumbar spondylolisthesis. The patient was managed by myofascial release of levator scapulae and cervico-thoracic central PA mobilization. There is no literature found describing these interventions for lumbar spondylolisthesis.

Case Description: The patient was a 43 years old woman with LBA with radiating pain to left lower limb due to lumbar spondylolisthesis. She received stretching of levator scapulae, piriformis & rectus femoris, cervico-thoracic central PA mobilization, passive lumbar flexion mobilization, core strengthening exercises. Treatment was given 5 days a week for 20 sittings.

Outcomes: Percentage of slippage.

Conclusion: Stretching of levator scapulae and cervico-thoracic central PA mobilization may help in reducing forward slippage in lumbar spondylolisthesis.

Keywords: *Mobilisation, Cervico-Thoracic Dysfunctions, Myofascial Pain Syndrome, Spondylolisthesis, Muscle Energy Technique, Maitland*

INTRODUCTION

The term spondylolisthesis was first described in 1854 by Kilian as a slow displacement of superior vertebral segment over the inferior vertebra[1]. Approximately 2-5% of general populations have spondylolisthesis, of which 50% are asymptomatic[2]. Spondylolisthesis in adult population is associated with radiculopathy in 62%[3], activity related lower back pain and neurological claudication[4]. Spondylolisthesis can be diagnosed using plain radiography (oblique and lateral view) and CT scan[5]. There are five types of spondylolisthesis: dysplastic, isthmic, degenerative, traumatic and pathologic[6]. Severity of spondylolisthesis is graded on the basis of the percentage of translation of one vertebra on the caudal vertebra[7]. In low slip spondylolisthesis grade I (up to 25%) and grade II (26 - 50%), conservative treatment including physiotherapy is the first treatment of choice[8].

CASE DESCRIPTION

The patient was a 43 year old woman reported to the physiotherapy outpatient Department of SVNIRTAR with the complaint of LBA radiating down to left lower limb since about 3 months. Pain more on standing and walking relieved in lying with hips & knees flexed. She lived with her husband & was a housewife. She wanted to perform her household activities as usual.

Examination: The physical examination revealed pain score 9 by visual analogue scale[9], increased lumbar lordosis without any side deviation, lumbar flexion was grossly restricted; extension was terminally painful with segmental hypermobility at L4-5 level. Bilateral pirifomis tightness was present (left greater than right), SLR left -70, right-75 with sciatic tension. Myofascial pain syndrome as characterized by taut band with trigger point was present in left levator

scapulae, compression of which reproduced the original low back & leg pain[10, 11]. Maitland's central PA pressure over C7, T1, T2 reproduced the original symptoms and segment hypomobility of cervico-thoracic spines were present[12]. X- ray lumbar spine lateral view showed anterior slippage of L4 over L5 vertebral body. Percentage of vertebral slip was measured in lateral radiograph by using AutoCAD 2006 software program. Meyerding classified the grades of vertebral slip[7]; Tillard (1954) formulated a simple equation to calculate the percent slip. Percent slip = the displacement of L4 on L5/width of L5 X 100. The percentage of slip was 35.2 %. There was no neuromuscular deficit.

The physical diagnosis was L4 lumbar spondylolisthesis with lumbar flexion dysfunction and cervicothoracic extension dysfunction.

The plan of Physiotherapy management was developed to address the lumbar flexion and cervicothoracic extension dysfunctions, tight piriformis, rectus femoris, levator scapulae and weak abdominals.

INTERVENTIONS

The patient was treated with bilateral piriformis stretching in supine with hips and knees flexed, thighs crossed with the painful left thigh over the right[11, 13]. Muscle energy technique with resisted hip adduction while breathing in was followed by relaxation and stretching by adducting the thighs. 10 repetitions followed by 30 seconds sustained stretch was applied[11].

Rectus femoris was stretched in supine towards the edge of the bed, so that the side to be stretched remained out of the bed. Patient was asked to hold the leg above the ankle and opposite hip & knee flexed towards the abdomen by the other hand. Therapist standing by the side of the patient pressed the thigh towards the abdomen to obliterate the lumbar lordosis and extended the thigh to be stretched to the end range[14]. Muscle energy technique with resisted hip flexion while breathing in was followed by relaxation and stretching by extending the thigh. 10 repetitions followed by 30 seconds sustained stretch were applied to both the sides[11].

Lumbar flexion was given in supine with hips and knees flexed, fingers clasped and hands behind the neck. Therapist standing by the side of the patient pressed the bent elbows and raised the upper trunk, so that trunk flexion was obtained with the bent elbow in front of the chest acting as fulcrum[15]. 30 seconds mobilization followed by rest for 30 seconds were applied for 4 times.

Stretching of levator scapulae was applied in prone with the arms crossed across the chest. Physiotherapist standing at head end with the thumbs inserted underneath the superior angles of scapulae to which levators are attached[16, 34]. Muscle energy technique with resisted submaximal contraction of levators while breathing in was followed by relaxation and further stretching. 10 repetitions followed by 30 seconds sustained stretch were applied to both the sides.

Central PA pressure over C7, T1, T2, T3 & T4 with the amplitude that reproduced the patient's original symptom and tolerated by the patient were applied for 30 seconds each[12].

The patient was advised to do static abdominal exercises at home, 5 seconds contraction followed by 10 seconds relaxation, 10 repetitions 5 times daily.

After 7th sittings no leg pain was reproduced while stretching levator scapulae and after 10 sittings no leg pain was reproduced while applying central PA pressure. After 10 sittings the pain score improved from 9 to 3. After 10 sittings all stretching, lumbar flexion mobilization were continued. Cervico-thoracic central PA mobilization with greater amplitude was applied to all upper thoracic spines; those were found to be hypomobile. After 20 sittings there was no original pain, but soreness in the back due to mobilization was present. X rays LS spine lateral view showed reduction of anterior slippage from 35.2 % (fig) to 15.63% .

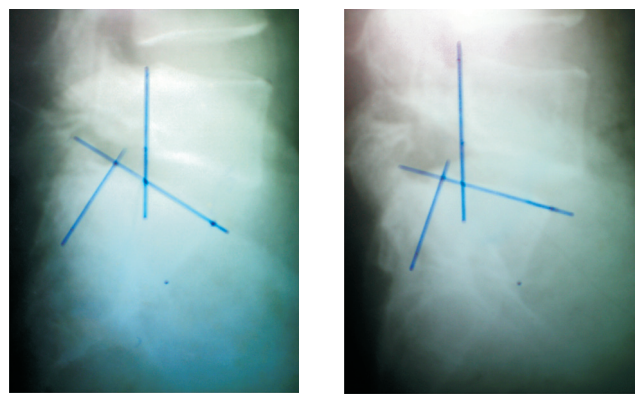

Fig. X-ray L-S (pre-intervention) X-ray L-S (post-intervention)

OUTCOMES

The patient received stretching of piriformis, rectus femoris, levator scapulae and strengthening of abdominals, passive physiological lumbar flexion mobilization and cevicothoracic central PA mobilization for 20 sittings. The initial anterior displacement of L4 on L5 was 35.2 %, after 20 sittings it was reduced to 15.63%.

DISCUSSION

The case was grade II spondylolisthesis with radiculopathy. Laxity at L4, L5 results in hyper-extension and pain. Stabilisation at this level can reduce the pain and improve the functions.

The thoraco-lumbar fascia acts as nature's "back belt". It spans the area from the iliac crest and sacrum up to the thoracic cage. The superficial lamina gets tensed by contraction of various muscles, such as the Latissimus dorsi, Gluteus maximus and Erector muscle. It has extensive attachments starting from posterior nuchal fascia, levator scapulae muscle cephalically to the biceps femoris & soleus muscle caudally. It also helps in transference of load through the trunk to lower extremities and as a result effectively deloads the spine if functioning appropriately.[19]

Inefficient functioning of TL fascia can be due to many causes like weakness of muscles attached to fascia, fibrotic changes of muscle with loss of elastic properties. This leads to an increased load transferred through the spine gradually leading to extension loading & degeneration. Improving length of the fibrotic muscles will improve the mobility of the lumbar spine and may help in pain relief. Stretching of the levator scapulae helps in back pain with or without radiating pain.

The more the thoracic kyphotic curvature, the more lumbar and cervical lordosis or tendency for such[20]. With regard to the lumbar spine, the lower lumbar regions at L-4 and L-5 levels are most affected. Hypomobility and restriction of extension at proximal levels can lead to compensatory hyperextension below it. Extension is associated with posterior to anterior gliding of vertebral body, so compensatory hyperextension at lower lumbar spine may precipitate the spondylolisthesis and low back pain[21].Central PA mobilisation[22, 23, 24, 25, 26, 27] of the cervico-thoracic hypomobile segments, which reproduces the original back pain and/ or radiating pain, to increase thoracic extension may reduce compensatory hyperextension at lower lumbar spine, so is helpful in LBA. Hypomobile spine must be mobilized so that an even distribution of movement is achieved[21].

Raymond & John Evans (1997) measured the intervertebral movements of the lumbosacral spine produced by PA mobilization - an in vivo radiographic study, which strongly suggests that the spine is subjected to 3-point bending under the application of mechanical loads. Under the mobilization load the lumbar motion segments were found to extend. In a series of cadaveric studies, Lee and Evans (1992, 1994) noted that spinal PA mobilization produced extension moments and shear forces to lumbar motion segments. McCollam and Benson (1993) reported an increase in extension range of movement following spinal PA mobilization[22].

Drawback of myofascial release technique, central PA mobilisation of Cervicothoracic spine includes some found difficulty to tolerate the position and some complained of shoulder pain.

In Conclusion Low back pain due to spondylolisthesis associated with myofascial pain syndrome of periscapular muscles and cervicothoracic extension dysfunction may be benefited by stretching of periscapular muscles and mobilisation of cervicothoracic spine.

Conflict of Interest

The researchers have not received or undertaken or had no interest in any of the following from/for/of the study during the study period : Payment or receipt of honoraria, Research grant, travel grant or conference expenses and other remuneration or benefit.

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