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Case Report of Lumbar Spinal Canal Stenosis with Lumbar Curvature Treated by Infrared Wave Therapy and Flexion-Distraction Therapy in Combination with Stretch and Strength Training

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ABSTRACT

Background: *Lumbar spinal canal stenosis(ICD-M48.0) is characterized by anatomical and functional narrowing of the osseous ligamentous vertebral canal and intervertebral foramen that causes direct compression or indirect disturbance of the dural sac, caudal nerve root, and vessels, which is usually seen in elderly. Typical symptoms of lumbar spinal canal stenosis include radiation to lower extremities, intermittent claudication, and low back pain, with characteristic findings such as slow onset, different severities, repeated attacks, and severe symptoms but mild signs. Claudication means lameness or limping. Discomfort may begin primarily in the buttocks, and spread to the posterior thigh and into the leg. Although walking most often precipitates manifestations, standing may also induce them, especially with the back in extension. Functional canal stenosis is more important than bony spinal canal stenosis in clinical presentation.* ***Conclusion:*** *We report a case of a 56-year-old patient with severe intermittent claudication and numbness in lower extremities due to degenerative lumbar spinal canal stenosis treated with Infrared wave and flexion-traction therapy in combination with stretch and strength training as non-operative treatments.*

Keywords: Spinal Canal Stenosis, Degenerative Lumbar Spinal Canal Stenosis, Flexion-Distraction Therapy, Intermittent Claudication, Exercise Therapy.

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INTRODUCTION

Degenerative lumbar spinal canal stenosis (DLSCS) can be defined as narrowing of the lumbar spinal canal and the neural tube due to degenerative changes, which in turn causes compression and stimulation of nerve roots, thus series of clinical symptoms, that is usually seen in middle age and elderly.

Neurological intermittent claudication involve numbness and paralysis in the posterolateral part of the legs and thighs during a long time of walking and standing, or extension activities, and reduced pain when flexed forward. During flexion the laminae of the two adjacent vertebrae move apart and interlaminar space widens, producing lengthening and thinning of the ligamentum flavum. Some researchers quantitatively studied the changes in the dimension of the spinal canal in physiological flexion and extension. They found that from flexion to extension the average reduction in the dimension ranged from 12 to 30 percent.

Thus, it is important to maintain flexion in spinal canal stenosis to relieve compression of the caudal nerve root. Intermittent claudication occurs not only in the caudal nerve compre ssion by mechanical agents but also in the blood circulation disturbance of the caudal nerve by compression. There is no standard physical therapy for lumbar spinal canal stenosis.

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In lumbar canal stenosis, exercise therapy also focuses on Williams' flexion exercise and core body strength that reduces lordosis and decrease stress of the lumbar spine.

We improved intermittent claudication by relative widening of spinal canal with flexion-distraction therapy and flexion exercise, holding flexion position of lumbar spine with core body strengthening and enhancing blood circulation with infrared wave therapy.

Case Report

Name; Li XX **Sex;** male **Age**; 56 **Height**; 170cm **Body weight;** 85Kg **Duration of disease**; 7 years

Chief complaint

Pain and numbness in bilateral lower extremities, intermittent claudication

Present history

The patient was diagnosed as a lumbar sprain at the primary clinics in May 2015 after getting a sudden low back pain when lifting heavy something. Afterwards, lumbar pain was significantly improved by rehabilitation with massage, spinal manipulation, paraffin therapy, and electrotherapy at hospital.

Since February 2019, he has received balneotherapy and hydro-traction therapy for a month because of numbness in bilateral buttocks and radiating leg pain on the right side. The radiating leg pain on the right side improved somewhat, but when standing or walking for a long time he has getting on numbness in bilateral buttocks.

In March 2025, the symptoms became more severe and he was admitted to the hospital. At the time of admission, when walking about 50 meters he was unable to go on due to anterior femoral muscular pain and numbness and weakness of lower extremities, which was relieved by forward flexion of lumbar spine or squatting for 2-3 minutes.

Examination findings

Physical examination

- Bilateral leg pain(right >left), VAS: 6
- Distance of claudication: 50m
- Limited ROM of extention and right lateral flexion right rotation due to increased pain.
- Standing and foreward flexion examination-relief of pain
- Standing and backward flexion examination- exacerbation of pain
- On palation tightness of the bilateral quadratus lumbar muscles and right piriformis muscle was palpable.

Neurological findings

SLR(-), Lhermitte's (+)

ODI(Owestry Disability Index): 33

Radiologic findings

MRI findings

L3/4 reduced intervertebral hight , disc degeneration, L3/4 disc, anterior and posterior protrusion, end plate destroy, L3/4 severe spinal canal stenosis (proliferation of flavum ligament , Interarticuar joint thickening, disc protrusion, narrowing of IVF herniation on both side, right >left) L3 anterior spondyloliesthesis grade 1, L4 posterior spondyloliesthesis grade 1; L4/L5 central and narrowing of IVF herniation in both side, L4/L5 Anterioposterior diameter of vertebral canal 10mm, Area of vertebral canal: 90mm^2

DR findings

PA: spondyloliesthesis of L3, left curvature of lumbar spine by disc degeneration, left rotation of L3 SP and L4 SP, Slight high crest iliac on the right side

LAP: Reduced Lumbar lordosis, L3 anterior spondyloliesthesis, L4 posterior spondyloliesthesis, L1- L5 anterior osteophytes, L3 posterior inferior osteophyte, abdominal aorta arteriosclerotic calcification, L4/5 interspinous process sclerosis (Baastrup), S5-C1 transitional deformation

Treatment

First, infrared wave therapy was applied. The infrared lamp was placed 20 cm away from the lumbar region, with intensity of 8 for 20 minutes, once a day. A period included 20 days. Second, Flexion-distraction therapy was peformed.

Cox-bed(ERGOSTYLE-FX) was used, on which the patient was placed in a prone position during traction, the patient's waist and ankle were tied with belt, respectively and both arms were placed with hands grasped arm supports.

The flexion- distraction was sustained with increase in flexion angle, but the maximum flex-angle did not exceed 30°. Flex-distraction was applied once a day for 20 days. Third, William's exercise(knee to chest, double knee to chest, pelvic tilts, wall-standing lumbar flexion was applied. Hamstring/ paraspinal/ quadriceps femoris / gastrocnemius muscle stretching were performed 7-8 times a day. Abdominal transverse muscle stengthening exercise; Lie down and hold for 1 to 2 minutes with belly button pulled toward the floor. Performed 7 to 8 times a day.

Evaluation of theapeutic effects

We evaluated the effect of treatment was evaluated before an after treatment(after 20 days) respectively. We assessed pain severity using VAS(Visual Analogue Scale).

The 0 point means 'painless', 10 points 'intolerable extreme pain'.We assessed lumbar spine function status of both groups using ODI(Owestry Disability Index). These include 10 indices in three domains; pain(severity of pain, effect of pain on sleep), simple function(lifting, sitting, standing, walking), and complex function(daily life, sexual activity, social activity and communication). The lowest score for each index is 0 and the highest score is 5. The greater the value, the more severe the lumbar spine dysfunction.

RESULT

Bilateral leg pain(VAS 2), ODI 12

CONCLUSION

We treated non-operatively a 56-year-old patient with degenerative lumbar spinal canal stenosis with severe claudication and spinal disturbances including anterior and posterior disc protrusion, curvature of lumbar spine, spondyloliesthesis, interspinous process sclerosis (baastup).

Conservative therapy for patient with DLSCH includes physiotherapy, medication, massage, traction therapy, etc. However, any treatment modality has a main goal of relieving pain within a short period of time. Currently, the common methods of lumbar traction include three-dimensional traction, self-gravity traction, and angular traction.

We believed that the application of flexion-sustained traction and William's exercises reduced caudal nerve root compression by widening the relative caliber of the spinal canal, and IR therapy improved caudal blood circulation, thus alleviating both lower extremity numbness and intermittent claudication. It is also thought that different exercises along the disorder have relief of the pain and numbness.

REFERENCES

1. Asako Yamamoto et al, A case of Proteus syndrome with severe spinal canal stenosis, scoliosis, and thoracic deformity associated with tethered cord, Jpn J Radiol 2012, 30:336–339
2. P. Gopinathan, Lumbar spinal canal stenosis-special features, Journal of Orthopaedics 2015 12:123 -125
3. Michael A. et al, Conditional manual: Lumbar stenosis. Professional Health System. 2010, 57(8): 64-65
4. Paul S. et al, Degenerative Lumbar Spinal Stenosis: Evaluation and Management, J Am Acad Orthop. Surg. 2012, 20: 527-535
5. Jiang Guiyun et al.: Observation on the efficacy of continuous low-weight traction in the treatment of lumbar degenerative spinal stenosis.1(38), 54, 2016.