Gaziantep Tıp Derg 2012;18(1): 46-47
Gaziantep Med J 2012;18(1): 46-47

*Gaziantep Tıp Dergisi*
*Gaziantep Medical Journal*

Olgu Sunumu
Case Report

# Symptomatic ossification of the ligamentum flavum at lumbar spine with radiological demonstration: a rare case

## Lomber omurgada ligamentum flavumun semptomatik ossifikasyonunun radyolojik gösterimi: nadir bir olgu

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**Abstract**
Ossification of the ligamentum flavum (OLF) is a disease of ectopic bone formation within the ligamentum flavum, which may result in mass effect and neurological symptoms. It mainly occurs in the thoracic spine, and this is followed by the cervical then rarely in the lumbar spine. Herein, we present a rare case of OLF of the lumbar spine with radiological findings.
**Keywords:** Computerized tomography; ligamentum flavum; ossification

**Özet**
Ligamentum flavum ossifikasyonu, flaval ligamanlar içerisinde ektopik kemik oluşumu ile karakterize, kitle etkisine ve nörolojik semptomlara neden olabilen bir hastalıktır. Sıklıkla torasik bölge etkilenir ve bunu sırasıyla servikal ve nadir olarak da lomber bölge izler. Burada lomber seviyede ligamentum flavum ossifikasyonu olan nadir bir olgunun radyolojik bulgularını sunuyoruz.
**Anahtar kelimeler:** Bilgisayarlı tomografi; ligamentum flavum; ossifikasyon

### *Introduction*

Lumbar ossification of the ligamentum flavum (OLF) is a very rare disease. OLF needs to be considered when a patient presents with signs and symptoms suggestive of spinal cord compression or cauda equina syndrome. Patients initially present with sensory disturbance, followed by limb weakness and later gait disturbance. Bowel and bladder dysfunction has also been reported where the cord compression is complete (1,2). The low thoracic spine is the most common location of OLF, T9–12 being the most affected region (3,4). In patients with OLF lumbar spine is very rarely affected, accounting for about 0.1% of cases (3). OLF is gradually being recognized as a cause of symptomatic spinal cord compression, due to increasing use of computerized tomography (CT) or magnetic resonance imaging (MRI).

### *Case Report*

36 years old female patient who admitted to hospital with bilateral leg weakness, spastic gait and associated sensory loss from L3 dermatome underwent radiological examination. Her lateral plain radiogram revealed linear opacity superposed over the L3-4 and L4-5 neural foramen (Figure 1). Axial and coronal-reformatted CT scan demonstrated the V-shaped ossification of the ligamentum flavum bilaterally at L3-4 level (Figure 2). Spinal MRI confirmed spinal canal stenosis and deterioration in the configuration of cauda equina due to enlargement of the bilateral ligamentum flavum characterized with linear low signal masses at lumbar level (Figure 3). The patient had lumbar laminectomy resulted in an excellent post-operative recovery with full return of all functions.

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### *Discussion*

OLF is characterized by replacement of the structure by ectopic bone formation through endochondral ossification (5,6). It is a different entity from calcification of the ligamentum flavum (CLF). CLF is composed of degenerated ligamentum flavum and with calcified granules consisting of calcium pyrophosphate dihydrate and hydroxyapatite, whereas OLF contains ectopic bone produced through endochondral ossification (1,7). Furthermore, CLF often affects women in the cervical spine, whereas OLF is more predominant in men in the thoracic and lumbar spine (7).

OLF is usually asymptomatic and has a very slow progress makes it difficult to diagnose. Patients with OLF in the lumbar spine have similar symptoms with degenerative lumbar stenosis cases. Because of their insidious progression, ossified lesions may lead to more severe cauda equina and/or spinal nerve damage than other causes of lumbar stenosis.

Ossification of the ligamentum flavum has been divided into 5 types based on extent/location of the ossification. The lateral type, Type I, is located only laterally at the origin of the ligamentum flavum at the articular processes. The extended type, Type II, extends from the lateral origin of the ligamentum flavum to the interlaminar portion of the ligamentum flavum. The enlarged type, Type III, protrudes into the canal posterolaterally but is not fused in the midline. The fused type, Type IV, consists of bilateral ossified ligaments that are fused at the midline with a groove at the fusion in midline. Type V, the tuberous type, occurs when the fused ossified ligamentum flavum forms a "tuberous" mass posteriorly in the midline, which protrudes into the spinal canal (4). Our case is consistent with Type III.

**Received:** 16.10.2011 **Accepted:** 27.11.2011
**Geliş Tarihi:** 16.10.2011 **Kabul Tarihi:** 27.11.2011

DOI: 10.5455/GMJ-30-2011-60
www.gantep.edu.tr/~tipdergi
ISSN 1300-0888

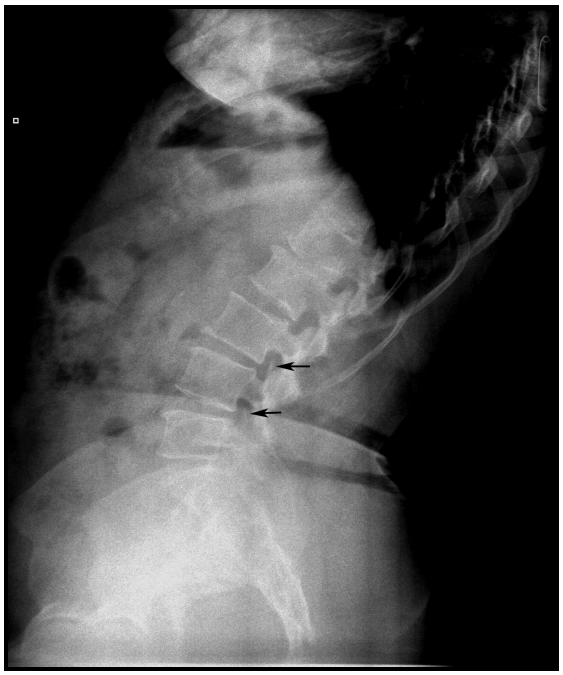

**Figure 1.** Radiography of the thoracolumbar spine showing linear opacities superposed over the L3-4 and L4-5 neural foramen (arrows).

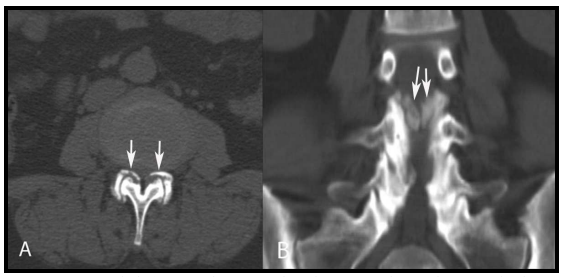


**Figure 2.** Axial (A) and coronal reformatted (B) bone window CT images demonstrating bilaterally V-shaped hyperdensity consistent with ossification of the ligamentum flavum (arrows).

Radiography is generally not sufficient to identify the OLF. CT scan and MRI can provide correct diagnosis and detailed information. Bone window CT can demonstrate the location, size, and extent of the disease. On axial CT scans ossification of the ligamentum flavum has V-shaped appearance of calcification as in our case. Therefore, the calcification is best identified on sagittal CT scans. Dura involvement is another important point in OLF, because this may change the approach/manner of the laminectomy and decompression. There was no dural involvement in our patient. The extent of spinal cord compression, underlying spinal cord injury and the compressive lesion can be demonstrated by MRI (8). Especially T2 and STIR sequences can easily demonstrate the spinal cord injury or myelopathy.

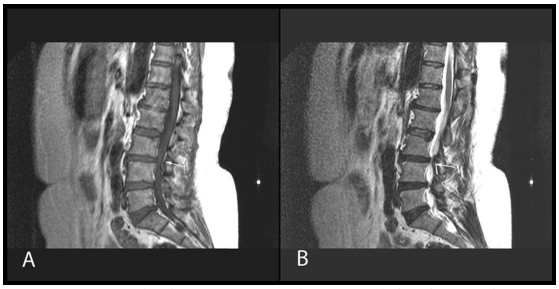


**Figure 3.** Sagittal T1 (A) and T2 weighted (B) images revealing linear heterogenous low signal lesions narrowing the spinal canal at L3 and L4 level in the region of the ligamentum flavum (arrows).

In conclusion, ossification of the ligamentum flavum should be considered in the differential diagnosis of surgical diseases such as lumbar disc herniation and tumoral lesions that can cause severe myelopathy.

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