

# Solitary Lumbar Osteochondroma Presenting with Foot-Drop: A Case Report

## *Düşük Ayakla Presente Olan Soliter Lomber Osteokondroma: Bir Olgu Sunumu*

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### ABSTRACT

Although osteochondroma is the most common benign bone tumor, the lumbar spine is an uncommon localization for solitary osteochondroma. Solitary lumbar osteochondromas rarely affect the neurological structures, because most of the lesions grow out of the spinal canal. We report a 48-year-old patient suffering from right foot-drop due to acute compression of right L4 nerve root by a lesion expanding into the spinal canal, originating from the right inferior articular facet of the third lumbar vertebrae. The symptoms improved after surgical removal of the lesion and histopathological examination of the lesion confirmed the diagnosis of osteochondroma. To the best of our knowledge, this is a unique case report in the literature.

**KEYWORDS:** Osteochondroma, Foot-drop, Lumbar spine, Differential diagnosis

### ÖZ

Osteokondroma en yaygın iyi huylu kemik tümörü olmasına rağmen, lomber omurga soliter osteokondrom için alışılmadık bir lokalizasyondur. Soliter lomber osteokondromlar nörolojik yapıları nadiren etkilerler, çünkü bu lezyonların birçoğu spinal kanal dışına doğru gelişirler. Biz üçüncü lomber vertebranın inferior artiküler fasetinden köken alan ve spinal kanal içine uzanım gösteren lezyonun sağ L4 sinir kökünü akut kompresyonu sonucu sağda düşük ayak yakınması bulunan 48 yaşındaki hastayı rapor ettik. Lezyonun cerrahi olarak çıkarılması sonrası semptomlar iyileşme gösterdi ve lezyonun histopatolojik inceleme sonucu osteokondroma ile uyumlu geldi. Bildiğimiz kadarıyla, bu literatürdeki bu şekildeki tek olgudur.

**ANAHTAR SÖZCÜKLER:** Osteokondroma, Düşük ayak, Lomber omurga, Ayırıcı tanı

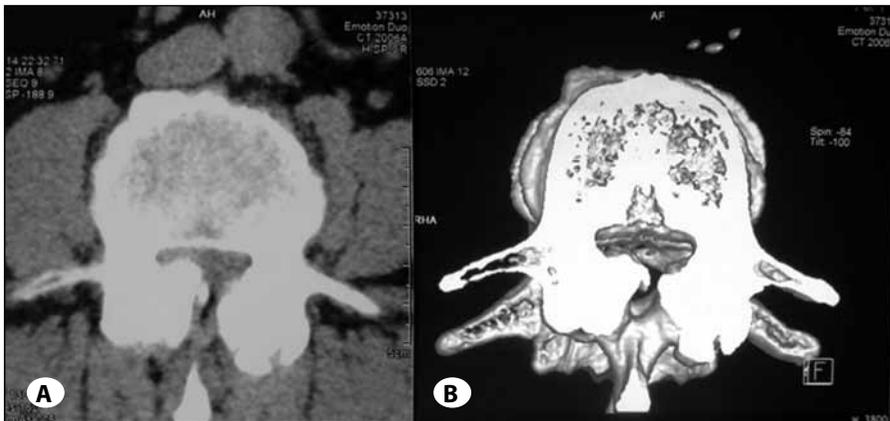
### INTRODUCTION

Osteochondromas usually arise from the long bones and can cause various signs and symptoms depending on their size and location (8,13). Only 1.3 to 4.1% of solitary osteochondromas involve the spine and are usually asymptomatic (1). A few cases suffering from leg pain or sciatica by solitary lumbar osteochondroma have been reported in the English medical literature (1-4,6,7,9-12).

Although the most frequent cause of foot-drop is a common peroneal neuropathy at the neck of the fibula, other causes such as anterior horn cell disease, lumbar plexopathies, L4 or L5 radiculopathies and partial sciatic neuropathy can rarely cause foot-drop (14). In the present case, we describe a patient who suffered from right foot-drop due to acute compression of right L4 nerve root by a solitary lumbar osteochondroma. Besides other common central or peripheral pathologies causing foot-drop, rare lower lumbar facet pathologies such as osteochondroma should be remembered as a possible predisposing factor.

### CASE REPORT

At the age of 48, a male patient presented with right foot extensor paralysis and radicular pain. His clinical history included intermittent low back and right leg pain that was treated conservatively during the last two years. Three hours before the admission, the patient fell on his right back side and then complained of acute severe pain in his back radiating to the medial aspect of his right lower leg and weakness in the right foot. Neurological examination revealed a positive reverse straight leg raising sign, decreased patellar reflex and complete extensor paralysis of the right foot. On radiological examination, plain x-ray was normal. Computed tomography (CT) showed a bony lesion arising from the right inferior articular processes of the L3 vertebra, and the neighboring spinal canal and lateral recess was significantly narrowed by this lesion (Figure 1A). Three-dimensional (3D) reconstruction of CT sections provided clear images of the osseous part of the lesion (Figure 1B). The cortex and spongiosa of the lesion was in continuity with the underlying parent bone. Sagittal



**Figure 1:** Axial CT of L3 through L4 showed a bony lesion arising from the left inferior articular processes of L3 vertebra. At the same level, the left lateral recesses and neural foramina were significantly narrowed by the lesion (A). 3D CT sections of the lumbar spine revealed that the cortex and the spongiosa of the lesion was contiguous with the underlying bone (B).

and axial magnetic resonance images (MRI) showed no disc pathologies, but a lesion involving the posterior elements as well as filling the lumbar spinal canal and narrowing the right L3 foramina posteriorly was present. T1- and T2-weighted MRI revealed the central high intensity core of the tumor surrounded by a ring-like low-intensity area. The lesion was not enhanced by gadolinium (Figure 2). Nerve conduction studies excluded common peroneal nerve compression. Compound motor action potential of the right anterior tibial muscle was nearly absent. Electromyography of the right anterior tibial muscle and quadriceps muscle revealed spontaneous activity, also indicating axonal degeneration.

The patient was urgently operated on to decompress the right L4 nerve root. During surgery, hemilaminotomy was performed to excise the lesion on the right side of the L3 vertebra. We observed that the right L4 nerve root was not adherent to the mass and was compressed at right lateral recess posteriorly by the bone lesion arising from the inferior articular process of the L3 vertebrae. The lesion was totally removed and the right lateral recess was decompressed completely. The histopathological diagnosis of the lesion was osteochondroma (Figure 3). Afterwards, whole plain radiographs of the body to reveal that there are no any other such lesions on the skeleton.

His postoperative course was uneventful and the patient was free of pain. During follow-up, his neurological deficit was significantly improved and extensor muscle strength of the right foot was 3/5 at two months later after the surgery.

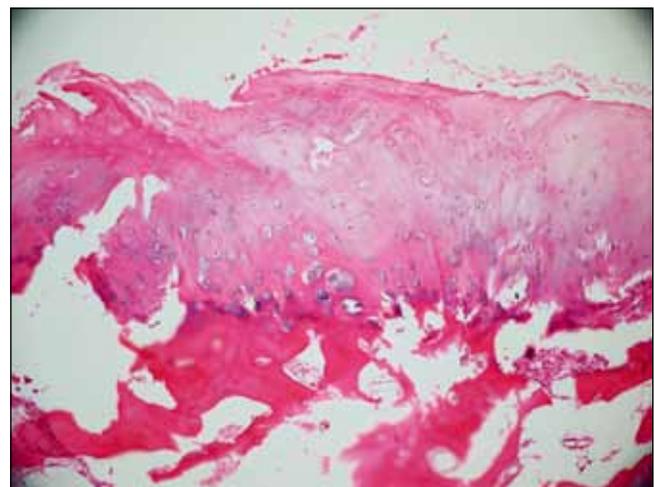
### DISCUSSION

Osteochondromas or "osteocartilaginous exostoses" are exophytic outgrowths from the parent bone surface that are composed of cortical and medullary bone with an overlying hyaline cartilage cap. Osteochondromas are classified in two distinct clinical settings; as either solitary lesions or multiple hereditary exostoses. The former usually have a tendency to arise from the metaphysis of the long bones, and are rarely found in the spine. Only 1.3 to 4.1% of solitary osteochondromas involve the spine (1).

Spinal osteochondromas are progressively expanding lesions during the growth period of the skeleton and the lesions



**Figure 2:** Sagittal T1-weighted MRI revealed the central high intensity core of the tumor surrounded by a ring-like low-intensity area and marked stenosis of the spinal canal.



**Figure 3:** Histopathological examination with H&E stain revealed a bone growth capped by cartilage.

often become quiescent when the epiphyses of secondary ossification centers of the vertebral column are closed. Thus, they usually become symptomatic during the second and third decades of life. Neurological symptoms caused by spinal osteochondromas are quite rare because most of the lesions grow out of the spinal canal (2). The most common presenting symptom is a painless palpable mass. Symptomatic lumbar osteochondromas are usually present with low back pain and sciatica (1-4,6,7,9-12). Foot-drop caused by solitary lumbar osteochondroma had never been reported in the literature. In the present case, interestingly, the patient who had a solitary lumbar osteochondroma was admitted to our clinic complaining of right foot-drop.

The term of "foot-drop" describes weakness of the dorsiflexor muscle of the foot. The most frequent cause of the foot-drop is a common peroneal neuropathy at the neck of the fibula. The lower extremity muscles in the humans are innervated by the distal peripheral nerves, derived from anterior horn cells in the lower spinal cord. The axons of the anterior horn cells in the lower spinal cord travel in the L4 and L5 spinal nerve roots, and these nerve fibres then enter the lateral trunk of the sciatic nerve. The lateral trunk of the sciatic nerve becomes the common peroneal nerve when the sciatic divides into its tibial and peroneal components just above the knee. The common peroneal nerve passes laterally through the popliteal fossa and wraps around the head of the fibula. At this point, the nerve divides into its terminal branches. The deep peroneal "anterior tibial" nerve, is one of the terminal branches of the common peroneal nerve, and provides motor innervation to the tibialis anterior, the main dorsiflexor muscle of the foot. Therefore, an anatomy-based differential diagnosis of the foot-drop includes lesions or disorders affecting anterior horn cells, L4 or L5 roots, lumbosacral plexus, the sciatic nerve and peroneal nerve (14).

In neurosurgical practice, anterior tibial muscle paralysis is generally thought to be due to axonal degeneration of nerve fibers, derived from spinal segment L5. However, modern electrophysiological studies to determine the segmental innervation of anterior tibial muscle showed considerable individual variations and segmental overlap (15).

Therefore, the possible mechanism of the patient's foot-drop was acute compression of the right L4 nerve root by solitary osteochondroma and narrowing foramina. Hyperextension and lateral bending of the patient's vertebral column toward the painful side might have narrowed the right L3 lateral recess and foramina. As a result, the right L4 nerve root could be compressed acutely in the spinal canal and at the entrance of the neural foramina. Atsushi et al pointed out that the dimensions of the intervertebral foramen changed constantly during daily activity, and symptoms in patients with spinal stenosis are therefore aggravated or relieved by the posture of their lumbar spine (5). In our opinion; the right L4 nerve root conduction could have been blocked by the compressive effect of the solitary osteochondroma as is the case with peripheral nerve neuropraxia.

Surgery is the best choice for the treatment of symptomatic spinal solitary osteochondromas. However, asymptomatic lesions can be followed conservatively. Local recurrence and secondary malignant transformation rates of osteochondromas are significantly low. In the literature, surgical treatment was reported to improve the neurological deficit in nearly %90 of cases of spinal cord compromise caused by solitary osteochondromas. No adjuvant therapy is necessary after the surgery (1,2,4,6,7,8,10,13).

Although spinal osteochondromas rarely cause neurological symptoms, they should also be considered in the differential diagnosis of foot-drop.

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