

Ukrainian Neurosurgical Journal. 2026;32(2):119-125  
doi: 10.25305/unj.349403

## Osteochondroma of inferior articular process in lumbar spine causing spinal stenosis: a case report

Tuan Anh Phan<sup>1</sup>, An Hoang Dai<sup>1</sup>, Minh Hoang Nguyen<sup>1</sup>, Khang Trien Truong<sup>2</sup>, Phi Duong Nguyen<sup>3</sup>, Thi Cao<sup>2</sup>

<sup>1</sup> Hospital for Traumatology and Orthopedics, Ho Chi Minh City, Vietnam

<sup>2</sup> Department of Orthopedics and Rehabilitation, University of Medicine and Pharmacy at Ho Chi Minh City, Ho Chi Minh City, Vietnam

<sup>3</sup> Department of Orthopaedic-Burn-Plastic Surgery, City Children's Hospital, Ho Chi Minh City, Vietnam

Received: 05 January 2026

Accepted: 03 March 2026

### Address for correspondence:

Thi Cao, Department of Orthopedics and Rehabilitation, School of Medicine, University of Medicine and Pharmacy at Ho Chi Minh City, 217 Hong Bang street, Ward Cho Lon, 70000, Ho Chi Minh City, Vietnam, e-mail: caothibacsi@ump.edu.vn

Osteochondroma is the most common benign bone tumor; however, spinal involvement is uncommon and may result in significant neurological compromise when neural structures are compressed. Osteochondroma arising from the lumbar facet joint is particularly rare and can clinically mimic degenerative spinal disorders. We report the case of a 47-year-old woman who presented with chronic low back pain and progressive right lower limb radiculopathy. Computed tomography demonstrated a 21 × 18 × 16 mm osseous lesion arising from the right inferior articular process of L3, showing clear cortical and medullary continuity with the parent vertebra. Magnetic resonance imaging revealed L3–L4 spinal canal stenosis with compression of the cauda equina, and the cartilage cap measured approximately 3 mm on T2-weighted imaging. The patient underwent posterior decompression with en bloc excision of the lesion. Segmental stability was preserved after facetectomy, and instrumentation was not required. Histopathological examination confirmed the diagnosis of osteochondroma. At the 12-month follow-up, the patient remained asymptomatic, with no radiological evidence of recurrence or instability. This case highlights the importance of comprehensive imaging evaluation, careful assessment of postoperative spinal stability, and complete excision including the cartilage cap to prevent recurrence.

**Keywords:** osteochondroma; inferior articular process; spinal stenosis; spinal exostosis; bone tumor

### Introduction

Osteochondromas are common benign bone tumors composed of cortical and medullary bone with a hyaline cartilage cap; however, spinal involvement is rare, accounting for only about 1%–4% of all osteochondromas [1, 2]. In a comprehensive review of spinal osteochondromas, Yakkanti *et al.* identified 132 solitary cases and 17 cases associated with multiple hereditary exostoses, with most lesions arising from the posterior column and frequently presenting with neurological symptoms requiring surgical excision [1]. The cervical spine is the most involved region, followed by thoracic and lumbar segments [3]. Although lumbar spinal osteochondromas have been reported, cases arising specifically from the inferior articular process (IAP) are very rare, and only a small number of individual case reports have detailed similar presentations at these levels [3, 4].

Moreover, many previously published cases have described either chronic symptom duration over months to years or incidental findings, whereas relatively few reports provide detailed criteria for postoperative spinal stability assessment without instrumentation. For example, Woo *et al.* reported a solitary lumbar osteochondroma arising from the L3 IAP presenting with sciatica; surgical excision led to symptom resolution, although objective dynamic stability evaluation was

not discussed [2]. Similarly, Shigekiyo *et al.* presented lumbar osteochondroma cases originating from the articular process in elderly patients with radiculopathy, highlighting the diagnostic challenge due to mimicry of degenerative spinal disorders [4].

This report describes a rare case of lumbar osteochondroma arising from the right L3 inferior articular process in a 47-year-old female presenting with acute radicular pain and neurogenic claudication after minor trauma. This case is noteworthy because – unlike many previous reports – it demonstrates a rapid clinical course, precise imaging characterization, and surgical decompression with en bloc excision that preserved segmental stability without instrumentation, as confirmed by dynamic radiographs. These findings expand current knowledge on clinical presentation and optimal management strategies for this uncommon entity.

### Case Presentation

A 47-year-old female presented with a 1-month history of progressive low back pain and right-sided radicular pain accompanied by paresthesia, which developed after a minor slip and fall injury. Notably, the clinical course was relatively rapid. The patient reported neurogenic claudication occurring after walking approximately 100 meters. There were no bowel or



bladder disturbances. Conservative management with nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants for three weeks failed to provide symptom relief.

There was no personal or family history of bone tumors or multiple hereditary exostoses. Neurological examination demonstrated decreased muscle strength (Medical Research Council grade 4/5) in the right L4 and L5 myotomes, accompanied by reduced sensation in the corresponding dermatomal distributions. Deep tendon reflexes were preserved. The detailed preoperative neurological findings are summarized in **Table 1**.

Plain radiographs of the lumbar spine demonstrated a focal osseous mass at the right L3–L4 facet joint (**Fig. 1**). Computed tomography revealed a well-defined exophytic lesion measuring 21 × 18 × 16 mm arising from the right inferior articular process (IAP) of L3, with clear cortical and medullary continuity with the parent vertebra, consistent with osteochondroma (**Fig. 2A, 2B**). Magnetic resonance imaging (MRI) showed significant spinal canal stenosis at the L3–L4 level with compression of the cauda equina (**Fig. 2C, 2D**). The cartilage cap thickness measured approximately 3 mm on T2-weighted imaging, without irregularity or features suggestive of malignant transformation.

Given the presence of progressive motor weakness, radiculopathy and neurogenic claudication secondary to canal compromise, surgical decompression was indicated. Under general anesthesia, the patient was positioned prone. Intraoperative fluoroscopy with needle markers was used to confirm accurate localization of the L3–L4 level (**Fig. 3A**). The surgical level was identified and marked on the skin surface (**Fig. 3B**). A 3-cm midline posterior incision was subsequently made. Unilateral exposure of the right L3 lamina and L3–L4 facet complex was achieved. Unilateral muscle exposure was performed on the right side, followed by deep exposure using diathermy to the L3 lamina and L3/L4 facet.

Approximately one quarter of the right L3 lamina and the entire inferior articular process (IAP) were resected en bloc using an osteotome (**Fig. 4A**). The

lesion originated from the right inferior articular process and projected medially into the spinal canal, as illustrated schematically in **Fig. 4B**. The right L3 IAP was sent for histopathological examination, while the right ligamentum flavum remained intact. Particular attention was paid to preserving the superior articular process of L4 and maintaining more than 50% of the facet joint complex, as well as the posterior ligamentous structures, to minimize the risk of postoperative instability. Hemostasis was carefully achieved, after which the incision was closed in layers with placement of a drainage tube, and the wound was finally covered with sterile dressing. The total operative time was 50 minutes, with an estimated blood loss of 40 mL.

Histopathological examination confirmed the diagnosis of osteochondroma, demonstrating typical features including a fibrous perichondrium, lobules of hyaline cartilage forming the cartilage cap, and an underlying stalk of mature cancellous bone (**Fig. 4C**).

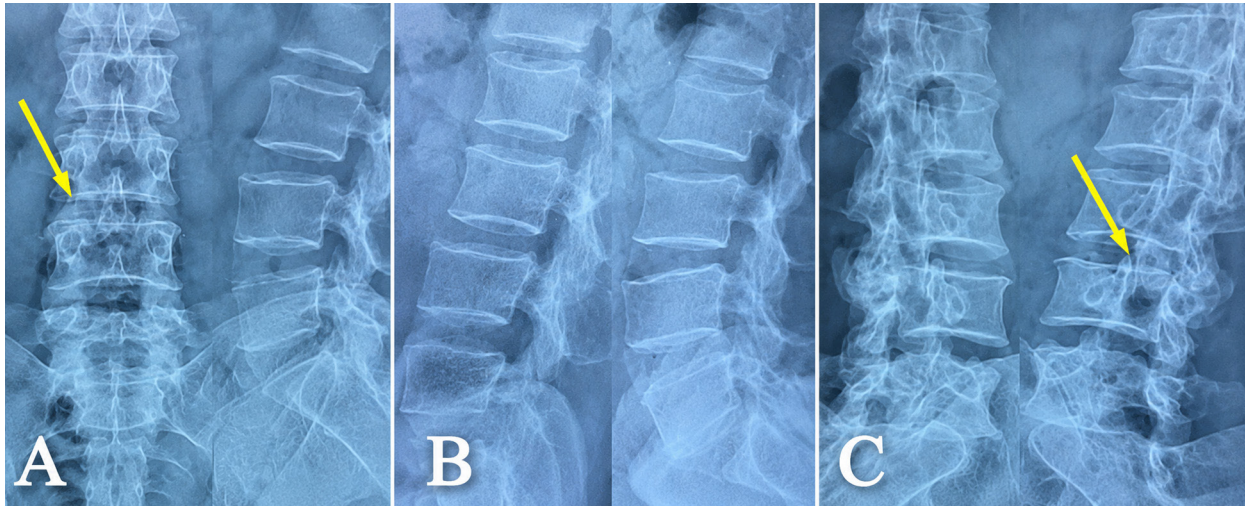
Postoperatively, the patient experienced immediate relief of back pain (VAS 2) and almost complete resolution of right-sided radicular pain (VAS 1), with no residual paresthesia. No postoperative complications were observed. Follow-up radiographs confirmed complete resection of the pathological lesion at the right L3 inferior articular process, with no evidence of residual tumor. Postoperative standing and dynamic flexion–extension radiographs were obtained to objectively assess segmental stability, with radiographic criteria for instability defined as sagittal translation >4.5 mm and angular motion >15° at the L3–L4 segment. The patient was able to sit and ambulate on postoperative day 1 and was discharged from the hospital on postoperative day 3.

At 3 months of follow-up, radicular symptoms had completely resolved. At 6 months, neurological examination was normal. At 12 months, the patient was able to walk 3 kilometers daily without pain or claudication. Follow-up CT demonstrated no evidence of tumor recurrence, and dynamic radiographs confirmed no instability (**Fig. 5**).

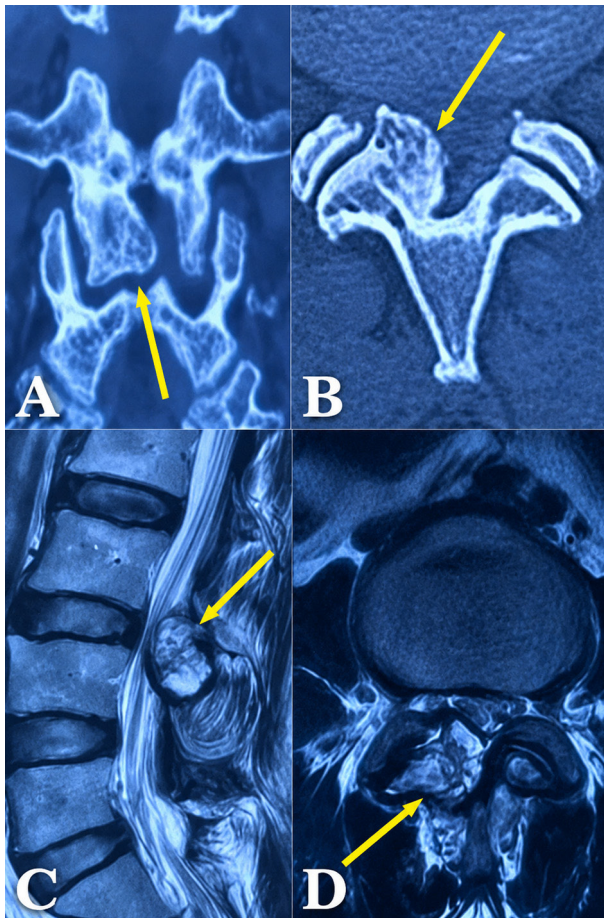
**Table 1.** Preoperative Neurological Examination Findings (MRC grade)

Level	Muscle Strength (Right)	Muscle Strength (Left)	Sensation (Right)	Sensation (Left)	Reflex (Right)	Reflex (Left)
L2	5/5	5/5	2/2	2/2	—	—
L3	5/5	5/5	2/2	2/2	—	—
L4	4/5	5/5	1/2	2/2	Normal	Normal
L5	4/5	5/5	1/2	2/2	—	—
S1	5/5	5/5	2/2	2/2	Normal	Normal

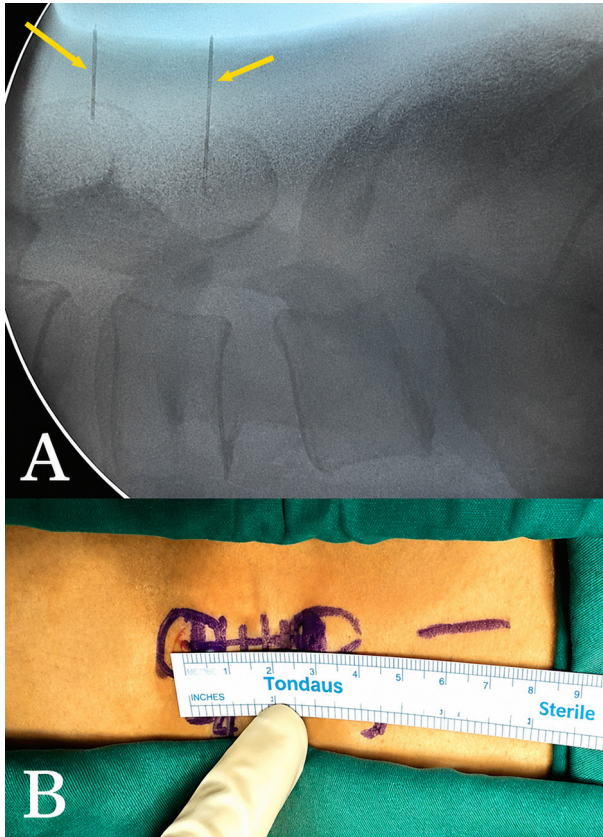
Notes. MRC = Medical Research Council muscle strength grading system (0–5 scale). Sensory function graded on a 0–2 scale (0 = absent, 1 = decreased, 2 = normal)



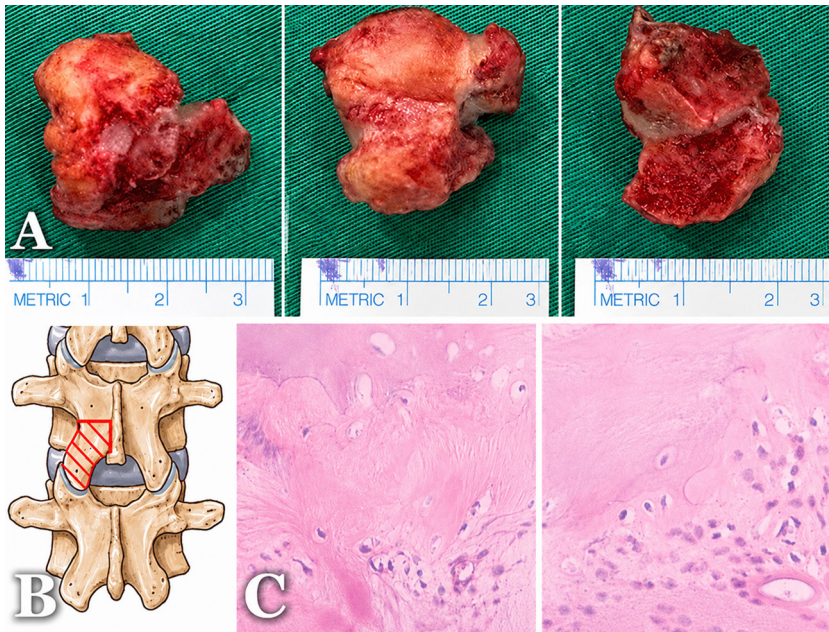
**Fig.1.** Preoperative lumbar spine radiographs. A - Anteroposterior view demonstrating a focal osseous prominence at the right L3-L4 facet region (arrow); B - Dynamic lateral views in flexion and extension; C - Right oblique view highlighting the exophytic bony lesion arising from the posterior elements (arrow)



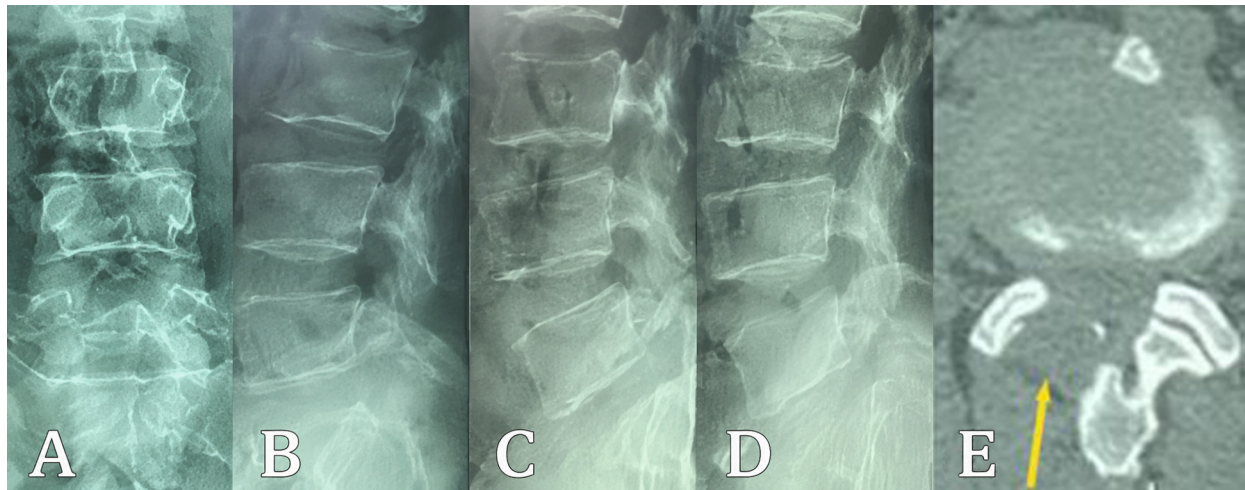
**Fig. 2.** Cross-sectional imaging of the lesion. A - Coronal CT reconstruction demonstrating an exophytic osseous lesion arising from the right inferior articular process of L3 (arrow), with cortical and medullary continuity with the parent vertebra; B - Axial CT image confirming the lesion projecting into the spinal canal (arrow); C - Sagittal T2-weighted MRI showing significant spinal canal stenosis at the L3-L4 level caused by the lesion (arrow); D - Axial T2-weighted MRI demonstrating compression of the cauda equina (arrow)



**Fig. 3.** Intraoperative localization of the surgical level. A - Lateral fluoroscopic (C-arm) image showing two needle markers (arrows) used to confirm the L3-L4 level prior to facetectomy; B - Skin marking and surface localization of the L3-L4 level before incision



**Fig. 4.** Gross specimen, schematic illustration, and histopathological findings. A - En bloc resected osseous mass with measurement scale, demonstrating the lobulated morphology of the lesion; B - Schematic illustration showing the tumor arising from the right inferior articular process of L3 and projecting into the spinal canal; C - Histopathological examination confirming osteochondroma, characterized by a hyaline cartilage cap overlying mature cancellous bone.



**Fig. 5.** One-year postoperative follow-up imaging. A-D - Standing anteroposterior, lateral, and dynamic flexion-extension radiographs demonstrating preserved alignment and no evidence of segmental instability at the L3-L4 level; E - Axial CT image at the previous tumor site showing complete resection without residual or recurrent lesion

### Discussion

Osteochondromas are benign osseocartilaginous tumors arising from aberrant enchondral ossification of the growth plate and are defined radiologically by continuity of both cortical and medullary bone with the parent skeleton [5, 6]. They are generally considered as hamartomatous proliferations, with growth typically ceasing at skeletal maturity, and may occur either as solitary lesions or as part of multiple hereditary exostoses (MHE), an autosomal dominant condition associated with mutations in the EXT1/EXT2 tumor suppressor genes [7]. Patients with MHE often develop multiple lesions and carry a higher risk of malignant transformation compared with solitary osteochondromas [7].

Although osteochondromas are the most common benign bone tumors, spinal involvement remains uncommon, reported in fewer than 5% of cases [8]. The cervical spine—particularly the upper cervical levels—is most frequently affected, whereas lumbar lesions are distinctly rare [3, 4]. Large literature syntheses have confirmed this distribution and demonstrated a predominance of lesions arising from the posterior elements. For instance, Yakkanti *et al.* (2018) [1] reviewed solitary spinal osteochondromas and highlighted both the posterior element predilection and neurologic presentations requiring surgery. Similarly, Lin *et al.* (2022) updated the literature on spinal osteochondroma and emphasized the predominance of cervical involvement and posterior column origin. Within the lumbar spine, osteochondromas arising from the facet or articular processes are particularly rare but clinically important because of their proximity to the spinal canal and neural foramina [3]. Case reports and small series have described symptomatic lumbar articular process lesions presenting with radicular symptoms [2], underscoring that this entity may mimic degenerative lumbar pathology and therefore be overlooked.

Neurological compromise from spinal osteochondroma is itself uncommon, affecting a small minority of patients, and typically manifests as

radiculopathy and/or progressive myelopathy depending on level and direction of growth. Acute neurological deterioration is rarely described but may occur when the lesion rapidly encroaches on the spinal canal or foramen, or when superimposed factors exacerbate stenosis. In the present case, the clinical course was notable for relatively rapid symptom progression after minor trauma, with radicular pain, paresthesia, and neurogenic claudication caused by cauda equina compression at L3-L4. This presentation broadens the recognized clinical spectrum of lumbar articular process osteochondroma and reinforces that even benign, slow-growing lesions can become symptomatic over a short interval when canal compromise reaches a critical threshold.

Imaging plays a pivotal role in establishing diagnosis and guiding surgical planning. Plain radiographs may reveal a bony outgrowth but can be limited by overlapping spinal structures. CT remains the most reliable modality for confirming the pathognomonic cortical and medullary continuity and delineating the extent of osseous involvement [5]. MRI provides complementary information regarding neural compression and characterization of the cartilage cap, which is essential for assessing malignant transformation risk [5]. In adults, a cartilage cap thickness greater than 1–2 cm and/or irregular signal characteristics should raise suspicion for secondary chondrosarcoma [5,8]. In our patient, the cartilage cap measured approximately 3 mm without suspicious features, supporting a benign lesion and correlating with the low reported malignant transformation risk for solitary osteochondromas [5, 7].

Management is determined by symptoms and imaging findings. Asymptomatic lesions can be observed with periodic clinical and radiologic follow-up [7]. However, progressive pain or neurological compromise constitutes a clear indication for surgical decompression and tumor removal [7]. The primary surgical objective is complete excision, including the cartilage cap, because residual cartilaginous tissue is a recognized risk factor for recurrence [7, 8]. Contemporary posterior

decompression techniques allow safe resection of posterior element tumors with acceptable morbidity even in anatomically constrained regions [7]. In the present case, posterior decompression with en bloc excision of the L3 inferior articular process achieved immediate symptom relief, and histopathology confirmed the diagnosis of osteochondroma.

A key technical consideration in lumbar facet or articular process osteochondroma is the balance between adequate decompression and preservation of segmental stability. Facetectomy—especially when extensive—may predispose to postoperative instability. Finite-element biomechanical data indicate that segmental motion increases with graded facetectomy, becoming more pronounced when facet resection exceeds approximately 45%, and worsening further with larger resections, thereby increasing the risk of iatrogenic instability [9]. Therefore, we deliberately preserved the superior articular process of L4, maintained more than half of the facet joint complex, and protected the posterior ligamentous structures. Importantly, these intraoperative stability-preserving measures were complemented by objective postoperative assessment using standing and dynamic flexion–extension radiographs, applying explicit instability thresholds (translation >4.5 mm; angular motion >15°). As no pathological translation or excessive angular motion was detected, instrumented fixation was not indicated. Although instrumented fusion is often considered following the resection of posterior spinal elements to prevent iatrogenic instability, we deliberately opted against instrumentation in this case based on several biomechanical and clinical rationales. First, the osteochondroma was an exophytic, surface-growing lesion without destructive infiltration of the load-bearing spinal columns. The en bloc resection functioned as hemifacetectomy, allowing us to preserve the pars interarticularis, the L4 superior articular process, spinous process, interspinous ligament, supraspinous ligament, and the contralateral facet joint. Biomechanical studies indicate that preserving more than 50% of the facet complex, along with an intact anterior column and posterior ligamentous complex, is generally sufficient to maintain segmental stability. Second, avoiding a rigid fusion at the L3-L4 level preserves the patient's natural lumbar kinematics and significantly mitigates the long-term risk of adjacent segment disease (ASD). For a localized, benign pathology, performing an instrumented fusion would represent an unnecessary overtreatment associated with increased surgical morbidity, blood loss, and muscle stripping. The patient was thoroughly counseled on this motion-preserving strategy, with a mutual agreement to perform strict radiographic monitoring for any delayed instability. The objective dynamic radiographs obtained at the one-year follow-up validated this approach, demonstrating complete absence of pathological translation or angular motion.

Prognosis after timely decompression is generally excellent, particularly when surgery is performed before irreversible neural injury [7]. Most patients experience significant symptom relief and functional recovery, and recurrence is uncommon following complete excision [2, 10]. Nevertheless, careful long-term surveillance is warranted because recurrence has been reported in cases of incomplete cartilage cap removal [8]. In

our patient, 12-month clinical and radiologic follow-up demonstrated durable symptom resolution, no evidence of tumor recurrence on CT, and preserved segmental stability on dynamic radiographs.

In summary, although lumbar osteochondroma is rare, lesions arising from the articular process can cause clinically significant canal compromise and neurogenic claudication. Lumbar osteochondroma should be considered in patients presenting with atypical radiculopathy or claudication when imaging reveals a focal exophytic osseous lesion. Combined CT and MRI are essential for accurate diagnosis and cartilage cap evaluation. In selected cases, limited facetectomy with preservation of stabilizing structures, supported by objective dynamic radiographic assessment, may allow safe omission of instrumentation while maintaining postoperative stability.

### Disclosure

#### *Ethics approval and consent to participate*

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was waived as this was a single case report without identifiable patient information, in accordance with institutional policy.

#### *Consent for publication*

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal upon reasonable request.

#### *Availability of data and materials*

All data generated or analyzed during this study are included in this published article. No additional datasets were generated.

#### *Competing interests*

The authors declare that they have no competing interests.

#### *Funding*

The authors received no financial support for the research, authorship, and/or publication of this article.

#### *Acknowledgments*

The authors are grateful to the medical staff of the Hospital for Traumatology and Orthopedics, Ho Chi Minh City, for their assistance in patient management.

### References

1. Yakkanti R, Onyekwelu I, Carreon LY, Dimar JR 2nd. Solitary Osteochondroma of the Spine-A Case Series: Review of Solitary Osteochondroma With Myelopathic Symptoms. *Global Spine J*. 2018 Jun;8(4):323-339. doi: 10.1177/2192568217701096
2. Woo HJ, Cho DC, Bae KJ, Sung JK. Solitary lumbar spinal osteochondroma presenting with sciatic pain: a case report. *Kor J Spine*. 2010;7(3):173-176. <https://www.e-neurospine.org/journal/view.php?number=356>
3. Lin GX, Wu HJ, Chen CM, Rui G, Hu BS. Osteochondroma Arising From the Inferior Articular Process of the Lumbar Spine in a Geriatric Patient: A Case Report and Literature Review. *Geriatr Orthop Surg Rehabil*. 2022 Jan 25;13:21514593211073028. doi: 10.1177/21514593211073028
4. Shigekiyo S, Nishisho T, Takata Y, Toki S, Sugiura K, Ishihama Y, Manabe H, Tezuka F, Yamashita K, Sakai T, Maeda T, Sairyo K. Intracanalicular Osteochondroma in the Lumbar Spine. *NMC Case Rep J*. 2019 Dec 18;7(1):11-15. doi: 10.2176/nmccrj.cr.2019-0031

5. Murphey MD, Choi JJ, Kransdorf MJ, Flemming DJ, Gannon FH. Imaging of osteochondroma: variants and complications with radiologic-pathologic correlation. *Radiographics*. 2000 Sep-Oct;20(5):1407-34. doi: 10.1148/radiographics.20.5.g00se171407
6. Tepelenis K, Papathanakos G, Kitsouli A, Troupis T, Barbouti A, Vlachos K, Kanavaros P, Kitsoulis P. Osteochondromas: An Updated Review of Epidemiology, Pathogenesis, Clinical Presentation, Radiological Features and Treatment Options. *In Vivo*. 2021 Mar-Apr;35(2):681-691. doi: 10.21873/invivo.12308
7. Bottner F, Rodl R, Kordish I, Winklemann W, Gosheger G, Lindner N. Surgical treatment of symptomatic osteochondroma. A three- to eight-year follow-up study. *J Bone Joint Surg Br*. 2003 Nov;85(8):1161-5. doi: 10.1302/0301-620x.85b8.14059
8. Agarwal S, Majety SK, Agarwal R, Veluru C, Earni SC, Anumolu A. Atypical presentation of L3 vertebral body osteochondroma mimicking cauda equina syndrome: a case report. *Ann Med Surg (Lond)*. 2025 Aug 15;87(10):6785-6790. doi: 10.1097/MS9.0000000000003734
9. Ahuja S, Moideen AN, Dudhniwala AG, Karatsis E, Papadakis L, Varitis E. Lumbar stability following graded unilateral and bilateral facetectomy: A finite element model study. *Clin Biomech (Bristol)*. 2020 May;75:105011. doi: 10.1016/j.clinbiomech.2020.105011