Case Report
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SPINE OSTEOCHONDROMAS: ARE THEY ALWAYS RARE AND HARMLESS? A CASE SERIES OF SIX SYMPTOMATIC CASES

OSTEOCONDROMAS DA COLUNA: SÃO SEMPRE RAROS E INOFENSIVOS? UMA SÉRIE DE SEIS CASOS SINTOMÁTICOS

OSTEOCONDROMAS DE LA COLUMNA: ¿SON SIEMPRE RAROS E INOFENSIVOS? UNA SERIE DE SEIS CASOS SINTOMÁTICOS

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ABSTRACT

Osteochondroma is the most common benign bone tumor, though spinal involvement is rare. This study presents a case series of six symptomatic spinal osteochondromas, including both solitary forms and cases associated with multiple hereditary exostoses (MHE). Clinical manifestations included pain, neurological deficits, and signs of myelopathy, with surgery indicated for tumor excision with or without spinal instrumentation. The average age was 20 years, lower than the literature average. Although benign, osteochondromas may cause significant complications, particularly when spinal cord compression is present. Complete excision and maintaining spinal stability are critical for successful outcomes. ***Level of Evidence IV; Case Series.***

Keywords: Osteochondroma; Spinal Neoplasms; Myelopathy.

RESUMO

O osteocondroma é o tumor ósseo benigno mais comum, mas sua ocorrência na coluna vertebral é rara. Este estudo apresenta uma série de seis casos de osteocondromas espinhais sintomáticos, incluindo pacientes com formas solitárias e com exostoses múltiplas hereditárias (MHE). As manifestações incluíram dor, déficits neurológicos e sinais de mielopatia, sendo a cirurgia indicada para ressecção tumoral com ou sem instrumentação. A média de idade foi de 20 anos, inferior à média da literatura. Apesar de benignos, os osteocondromas podem provocar complicações significativas, especialmente quando há compressão medular. A excisão completa e o cuidado com a estabilidade da coluna são essenciais para o sucesso do tratamento. ***Nível de Evidência IV; Série de Casos.***

Descritores: *Osteocondroma; Neoplasias da Coluna Vertebral; Mielopatia.*

RESUMEN

El osteocondroma es el tumor óseo benigno más común, aunque su aparición en la columna vertebral es poco frecuente. Este estudio presenta una serie de seis casos de osteocondromas espinales sintomáticos, incluyendo formas solitarias y asociadas a exostosis múltiples hereditarias (MHE). Las manifestaciones clínicas incluyeron dolor, déficits neurológicos y signos de mielopatía, siendo la cirugía indicada para la resección tumoral con o sin instrumentación espinal. La edad promedio fue de 20 años, inferior a la media reportada en la literatura. Aunque benignos, los osteocondromas pueden provocar complicaciones importantes, especialmente con compresión medular. La resección completa y la estabilización vertebral son esenciales para el éxito terapéutico. ***Nivel de Evidencia IV; Serie de Casos.***

Descriptores: *Osteocondroma; Neoplasias de la Columna Vertebral; Mielopatía.*

INTRODUCTION

Osteochondroma is the most common benign bone tumor, accounting for 10–15% of all bone tumors and 20–50% of all benign bone tumors.[1] It affects approximately 6 million people per year.[2] These tumors typically arise on the external surface of the metaphysis of long bones, consisting of mature bone tissue continuous with the bone marrow and covered by a cartilaginous cap.[3] The average age of symptomatic presentation of spinal osteochondroma is around 32 years, tending to be lower in peripheral lesions in children, ranging from 10 to 30 years.[2]

They may occur as a solitary lesion (SE) or as part of a hereditary condition known as multiple hereditary exostoses (MHE).[4] Solitary osteochondromas are more commonly found in the spine compared to osteochondromas associated with MHE.[4-6]

Their occurrence in the spine is relatively rare, representing less than 5% of solitary osteochondromas and only 4–7% of primary benign spinal tumors.[7] The most common location is the cervical spine, with increased incidence in the thoracic and lumbar spine in cases of MHE.[8]

Spinal osteochondromas can cause pain, radiculopathy, and myelopathy, often requiring surgical treatment.[7] Malignant transformation is rare in solitary osteochondroma (1%) but higher in MHE (up to 15%).[9]

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Surgery is indicated for symptomatic lesions with intractable pain and/or neurovascular compromise.[2] Complete resection of the cartilaginous cap is crucial to prevent recurrence.[9] In this article, we present a series of six cases of symptomatic osteochondromas.

METHODS

The present retrospective study is a case series, approved by the research ethics committee, CAAE 564293227.0000.5273, to present the clinical manifestations as well as treatment options for osteochondromas. To conduct the study, a search for histopathological results was carried out in the pathology department of a spine pathology referral center, considering only spinal osteochondromas that underwent surgical treatment and occurred within the last 15 years.

RESULTS

Six patients were identified and called in for outpatient follow-up consultation. In five patients, due to the classic characteristics of osteochondroma, a preoperative needle biopsy was not necessary, and excisional biopsy was chosen instead. In case three, due to the size of the lesion, the presence of pain, and the extensive cartilaginous cap, a needle biopsy was performed before the definitive surgery, and both results confirmed the diagnosis of osteochondroma.

Case 1

Male, nine years old, with a history of low back pain for several months. No neurological deficits were present. X-rays and computed tomography revealed a pedunculated tumor on the right side of the L1 spinous process. Due to the low back pain, *en bloc* resection of the tumor mass was performed along with a laminectomy at the affected level. Given the extent of resection required for stabilizing elements, instrumentation of the adjacent vertebrae was performed. The patient has a six-year follow-up with complete resolution of low back pain and no complications. (Figure 1)

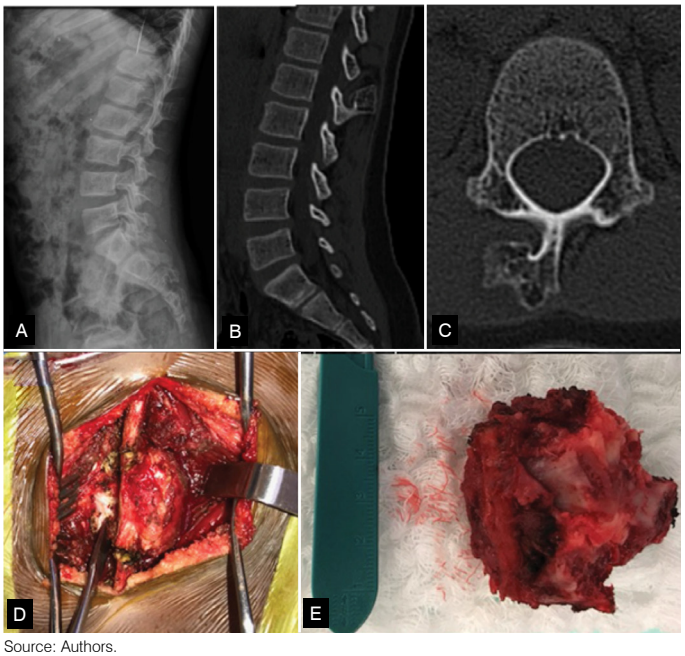

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Figure 1. (A): Lateral X-ray of the lumbar spine showing a mass in the region of the spinous processes at the L1 level; (B and C): Computed tomography in sagittal and axial views showing a pedunculated formation adjacent to the right side of the L1 spinous process; (D and E): Clinical photographs of the tumor mass exposure and the surgical specimen.

Case 2

A 13-year-old female presented with a mass in the dorsal region along the midline, extending laterally to the left. She reported occasional thoracic pain, with no other complaints. X-rays and computed tomography revealed a left paraspinal mass at the T7 and T8 levels, connected to the left transverse process and rib of T8. *En bloc* resection of the tumor was performed, including the transverse process and a portion of the left T8 rib. Instrumentation was not required. The patient had an early discharge without surgical complications and reported improvement in the occasional pain. She has a 7-year postoperative follow-up. (Figure 2)

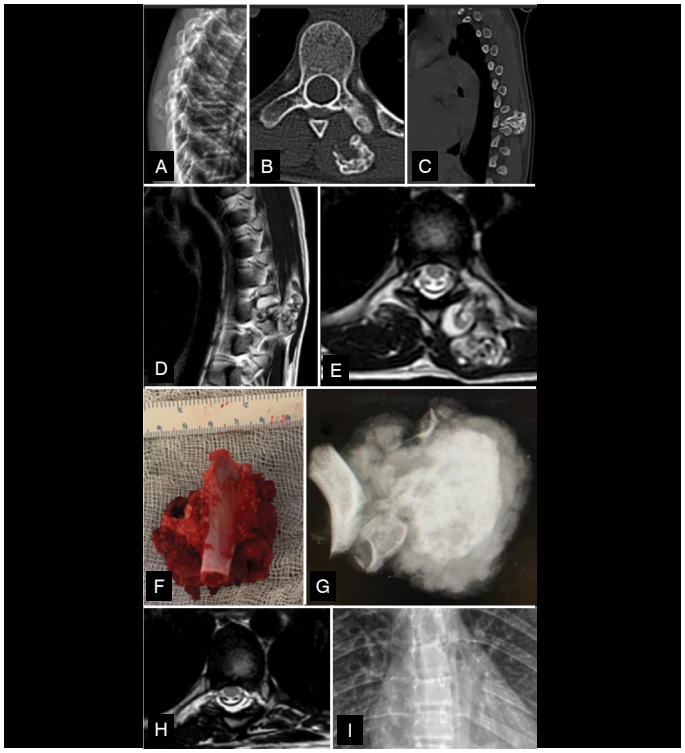

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Figure 2. (A): Lateral X-ray of the thoracic spine showing a mass in the posterior region at the T7–T8 level; (B and C): Computed tomography showing an exophytic bone tumor adjacent to the left transverse process of T8; (D and E): Magnetic resonance imaging demonstrating a heterogeneous mass with signs of bone and cartilaginous formation; (F and G): Clinical photograph and X-ray of the surgical specimen, confirming successful resection with clear margins as verified by pathological anatomy; (H and I): Magnetic resonance imaging and X-ray showing successful en bloc resection.

Case 3

Male, 19 years old, incidentally discovered to have a cervicothoracic mass on X-ray performed during admission examinations for the armed forces. He reported non-disabling pain and paresthesia in the left upper limb, with preserved strength. X-rays, computed tomography, and magnetic resonance imaging revealed a large left paraspinal mass extending from T1 to T6, with mass effect and involvement of the spinous processes and ipsilateral ribs. An *en bloc* excision of the tumor was performed, including left hemicorpectomy and parasagittal osteotomy of the costovertebral junction with margin, across four vertebral levels. This approach was chosen due to the sessile nature of the lesion. During surgery, due to spinal cord manipulation, the patient experienced a decrease in motor evoked potentials, which improved intraoperatively. In the postoperative period, he developed Horner's syndrome, which fully resolved after four months. Currently, after four years of follow-up, he reports mild pain in the operated area, relieved by pain killers. (Figure 3)

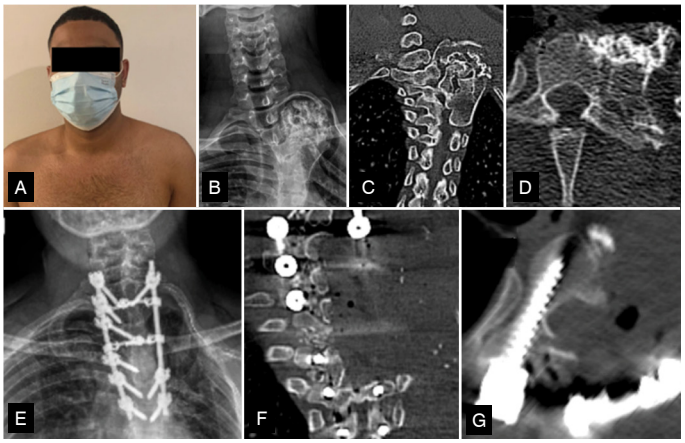

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Figure 3. (A): Clinical photograph showing shoulder asymmetry; (B): Anteroposterior X-ray of the cervical spine showing a calcified mass in the cervicothoracic transition region, associated with scoliosis; (C and D): Computed tomography in coronal and axial views showing a tumor adjacent to the transverse process and ribs from T1 to T6 on the left side; (E): Postoperative X-ray with reconstruction from T1 to T6, showing correction of the scoliosis; (F and G): Postoperative computed tomography showing left-sided hemicorpectomy of four vertebral bodies and parasagittal osteotomy of the costovertebral junction with clear margins.

Case 4

Male, 18 years old, diagnosed with MHE, reported the onset of paresthesia in the lower limbs and loss of balance three months ago. He showed early signs of myelopathy. Imaging revealed a tumor located in the posterolateral right region of the T9 vertebral body, causing mass effect on the spinal cord in that area. Tumor excision was performed after a costotransversectomy to access the lesion. Instrumentation of the adjacent levels was chosen to ensure stability. Currently, with two years of follow-up, the patient shows improvement in both paresthesia and balance loss. (Figure 4)

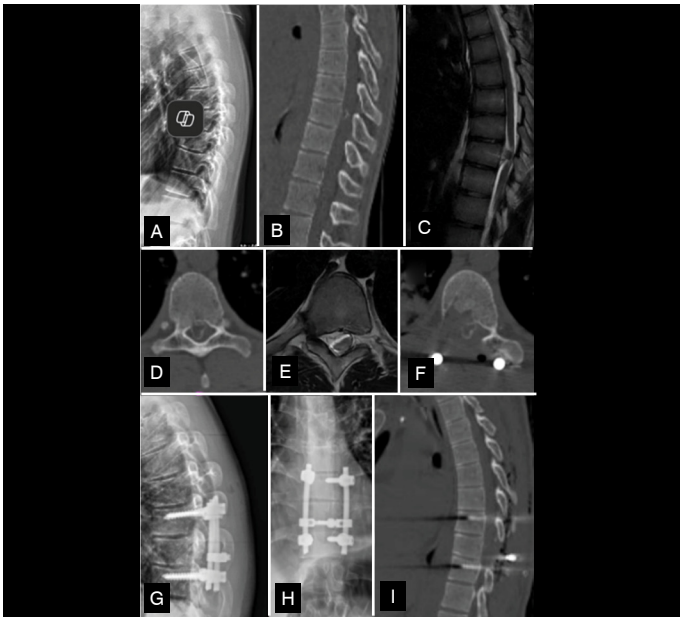

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Figure 4. (A, B, and C): Lateral X-ray of the thoracic spine, computed tomography, and T2-weighted sagittal magnetic resonance imaging showing an intraspinal mass with significant spinal cord compression at the T9 level; (D and E): Axial computed tomography and T2-weighted MRI demonstrating the mass effect of the lesion; (F): Postoperative CT scan showing lesion resection and a free vertebral canal; (G and H): Postoperative lateral and anteroposterior X-rays showing T8–T10 instrumentation; (I): Postoperative sagittal CT scan showing spinal canal decompression.

Case 5

Female, 17 years old, diagnosed with MHE, developed significant functional impairment in gait, with severe pain radiating to the right lower limb and motor deficit. X-ray, computed tomography, and magnetic resonance imaging showed a pedunculated tumor originating from the left pedicle of L1, expanding into and occupying the spinal canal, causing spinal cord compression. Resection of the lesion was performed, and due to the resulting instability, T12–L2 spinal fusion was added. The patient showed significant improvement in motor strength. (Figure 5)

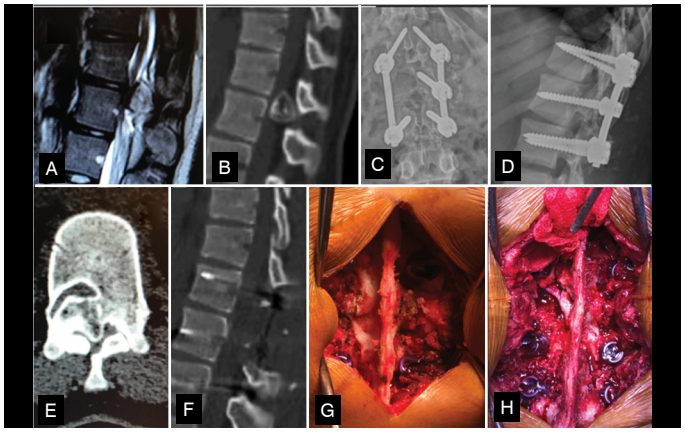

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Figure 5. (A, B, and E): T2-weighted sagittal magnetic resonance imaging, sagittal and axial computed tomography showing compression and mass effect from a blastic lesion at the T12–L1 level; (C and D): Postoperative anteroposterior and lateral X-rays showing T12–L2 instrumentation; (F): Sagittal computed tomography showing spinal canal decompression; (G and H): Clinical photographs showing the patient before and after lesion resection.

Case 6

Male, 45 years old, presented with tetraparesis and ataxia associated with cervical pain. X-ray, computed tomography, and magnetic resonance imaging revealed a sessile bone mass at the base of the posterior elements of C6 and C7, causing significant posterior compression of the spinal cord. *En bloc* resection of the lesion was performed, along with a C4–T2 spinal fusion for stabilization. After two years of follow-up, the patient showed significant improvement in symptoms. (Figure 6)

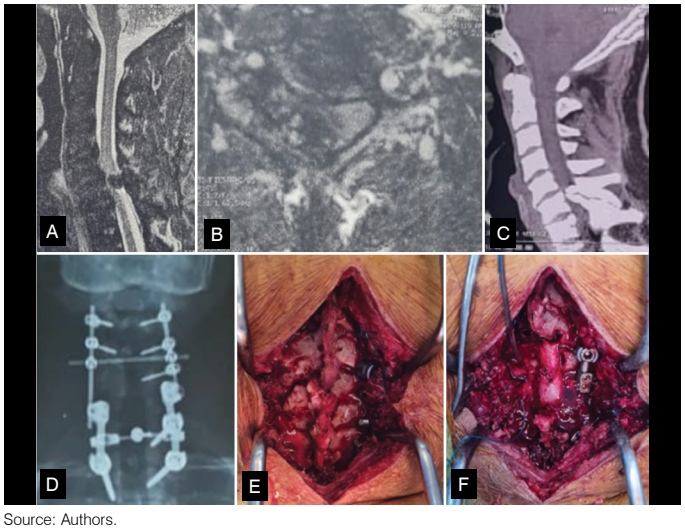

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Figure 6. (A, B, and C): T2-weighted sagittal and axial magnetic resonance imaging, and sagittal computed tomography showing compression and mass effect from a blastic lesion at the C6–C7 level; (D): Postoperative anteroposterior X-ray showing C4–T2 instrumentation; (E and F): Clinical photographs showing the patient before and after lesion resection.

DISCUSSION

When compared to the average reported in the literature (32 years), the mean age of the patients in this series was lowe (20 years), and there was a higher number of male individuals[4] compared to females.[2] We believe this discrepancy may be attributed to our limited number of cases.

Case 1 features a patient with a solitary osteochondroma located in the lumbar spine, which is not commonly observed, as most solitary osteochondromas occur in the cervical region[10] and are more frequently found in other areas when associated with MHE. It is important to emphasize that when surgical treatment is chosen, complete excision of the lesion is crucial to minimize the risk of local recurrence.[11] The predominance of lesions in the posterior vertebral elements can be explained by the presence of secondary ossification centers in the spinous and transverse processes, facet joints, and endplates of the vertebral body.[12]

In Cases 2 and 3, there is lesion extension into the ribs and a significant cartilaginous component. In the appendicular skeleton, a cartilaginous cap greater than 3cm in children and 2cm in adults suggests an increased risk of malignant transformation.[13,14] Although there is a lack of studies confirming this information specifically for the spine, the principle of wide, *en bloc* resection is adopted in such cases.

Cases 4, 5, and 6 demonstrate the possibility of myelopathy associated with osteochondromas, which can occur when the tumor grows into the spinal canal and may even be mistaken for other intraspinal lesions.[1,6]

Our case series shows that although osteochondromas are typically benign and asymptomatic, depending on the spinal level involved and the degree of tumor compression, surgery can become a challenging endeavor with potential for unfavorable outcomes, particularly due to manipulation of critical structures such as the spinal cord, nerve roots, pleura, and major blood vessels. In addition to resection, another challenge is maintaining spinal stability following the wide removal of stabilizing structures, which often necessitates instrumentation not only for stabilization but also to prevent deformities.[15]

CONCLUSION

Although osteochondromas are benign and generally asymptomatic lesions, the cases presented here demonstrate that they can cause significant pain and neurological deficits, requiring surgical excision, with or without spinal instrumentation.

All authors declare no potential conflict of interest related to this article.

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REFERENCES

1. Sakai Y, Nakashima H, Takatsu T, Imagama S. Clinical Features and Surgical Outcomes of Osteochondroma of the Spine. Malays Orthop J. 2023;17(1):117-123. doi: 10.5704/MOJ.2303.014.
2. Fowler J, Takayanagi A, Fiani B, Cathel A, Sarhadi KJ, Arshad M, et al. Diagnosis, Management, and Treatment Options: A Cervical Spine Osteochondroma Meta-Analysis. World Neurosurg. 2021;149:215-225.e6. doi: 10.1016/j.wneu.2021.01.148.
3. Quirini GE, Meyer JR, Herman M, Russell EJ. Osteochondroma of the thoracic spine: an unusual cause of spinal cord compression. AJNR Am J Neuroradiol. 1996;17(5):961-4.
4. Albrecht S, Crutchfield JS, SeGall GK. On spinal osteochondromas. J Neurosurg. 1992;77(2):247-52. doi: 10.3171/jns.1992.77.2.0247.
5. Roblot P, Alcalay M, Cazenave-Roblot F, Levy P, Bontoux D. Osteochondroma of the thoracic spine. Report of a case and review of the literature. Spine. 1990;15(3):240-3. doi: 10.1097/00007632-199003000-00020.
6. Khosla A, Martin DS, Awwad EE. The solitary intraspinal vertebral osteochondroma. An unusual cause of compressive myelopathy: features and literature review. Spine. 1999;24(1):77-81. doi: 10.1097/00007632-199901010-00019.
7. 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;8(4):323-339. doi: 10.1177/2192568217701096.
8. José Alcaraz Mexía M, Izquierdo Núñez E, Santonja Garriga C, María Salgado Salinas R. Osteochondroma of the thoracic spine and scoliosis. Spine. 2001;26(9):1082-5. doi: 10.1097/00007632-200105010-00019.
9. Sciubba DM, Macki M, Bydon M, Germscheid NM, Wolinsky JP, Boriani S, et al. Long-term outcomes in primary spinal osteochondroma: a multicenter study of 27 patients. J Neurosurg Spine. 2015;22(6):582-8. doi: 10.3171/2014.10.SPINE14501.
10. Bess RS, Robbin MR, Bohlman HH, Thompson GH. Spinal exostoses: analysis of twelve cases and review of the literature. Spine. 2005;30(7):774-80. doi: 10.1097/01.brs.0000157476.16579.a2.
11. Samartzis D, Marco RA. Osteochondroma of the sacrum: a case report and review of the literature. Spine. 2006;31(13):E425-9. doi: 10.1097/01.brs.0000220222.63828.d3.
12. Fiumara E, Scarabino T, Guglielmi G, Bisceglia M, D'Angelo V. Osteochondroma of the L-5 vertebra: a rare cause of sciatic pain. Case report. J Neurosurg. 1999 Oct;91(2 Suppl):219-22. doi: 10.3171/spi.1999.91.2.0219.
13. Woertler K, Lindner N, Gosheger G, Brinkschmidt C, Heindel W. Osteochondroma: MR imaging of tumor-related complications. Eur Radiol. 2000;10(5):832-40. doi: 10.1007/s003300051014.
14. Motamedi K, Seeger LL. Benign bone tumors. Radiol Clin North Am. 2011;49(6):1115-34, v. doi: 10.1016/j.rcl.2011.07.002.
15. Gasbarrini A, Cappuccio M, Donthineni R, Bandiera S, Boriani S. Management of benign tumors of the mobile spine. Orthop Clin North Am. 2009;40(1):9-19, v. doi: 10.1016/j.ocl.2008.09.009.