

## Oppenheimer's Bone Associated with an Accessory Unfused Spinous Process: A Rare Bone Variant Case Simulating an Acute Fracture of the Posterior Arch

KB B Bewuene Poda<sup>1\*</sup>, Ifrah Rr<sup>1</sup>, S. Ben Elhend<sup>1</sup>, B. Sloui<sup>1</sup>, N. Hammoun<sup>1</sup>, R. Roukhsi<sup>1</sup>, M. Atman<sup>1</sup>, A. Mouhsine<sup>1</sup>, S. Bellasri<sup>1</sup>

<sup>1</sup>Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

DOI: <https://doi.org/10.36347/sjmcr.2026.v14i03.005> | Received: 19.01.2026 | Accepted: 24.02.2026 | Published: 03.03.2026

\*Corresponding author: KB B Bewuene Poda  
Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

### Abstract

### Case Report

Anatomical variations, as well as incomplete fusion and ossification of the spine Developing vertebral structures can mimic and simulate acquired lesions. The ossicle Oppenheimer's is a distinct developmental variant, resulting from the non-fusion of a accessory ossification center at the tip of the articular process. Similarly, non-fusion of an accessory spinous process is another possible variant of the posterior arch of the spine. Patients with this condition may be asymptomatic or to present with back pain of varying intensity. We present the case of a 33-year-old man years old suffering from back pain following a minor lumbar injury, and presenting a symptomatic bilateral Oppenheimer's ossicle associated with a spinous process. The accessory bone was not consolidated. The diagnosis of an acute posterior arch fracture was ruled out, as radiological examinations revealed a characteristic cortex with regular contours. In our knowledge, the association between these two entities has never been described in the literature. Our goal is to highlight that this anatomical variation can be the cause of painful syndromes and should not be confused with a fracture or dislocation.

**Keywords:** Oppenheimer's Ossicle, Unfused Accessory Spinous Process, Posterior Arch Variants.

**Copyright © 2026 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Abnormalities and variations of the neural arc and its processes, of varying clinical importance, can be identified by medical imaging. Oppenheimer's ossicles, defined as a fragment of bone separated at the end of the articular process, are due to a secondary ossification center not fused in the lumbar vertebrae [6].

The Oppenheimer's ossicle, an accessory ossicle of the posterior vertebral arch, is well documented [1, 2]. The presence of an unresolved accessory spinous process is also well documented [3-8]. The association between these two entities has never been reported in the literature. Our clinical observation describes a rare and complex post-traumatic finding of bilateral Oppenheimer's ossicles associated with an unresolved accessory spinous process. Knowledge of this association can prevent a misdiagnosis of vertebral fracture.

## OBSERVATION

This is a 33-year-old man with no prior medical or traumatic history who presented with back pain following a minor lumbar injury sustained in a fall from a height of approximately 2.5 meters. Clinical examination revealed no neurological deficits or radicular neuritis.

Lumbar radiographs and computed tomography (CT) scans were ordered as part of the imaging workup. The radiographs revealed a bilateral cleft at the inferior articular process of L3 (Figure 1). A CT scan of the lumbar spine (Figure 2) was subsequently performed, confirming the bilateral hypoplastic configuration of this inferior process, with well-corticalized and attached ossicles. Furthermore, we also incidentally identified a supernumerary ossicle at the level of the spinous process of L4 [Figures 3 and 4]. The vertebral disc margins were regular, without herniation. Similarly, the other regions of the spine appeared normal.

No further tests were carried out and the patient was sent home with only pain medication.



**Fig. 1: X-ray of the lumbar spine. P.: Bilateral cleft at the level of the inferior articular process of L3**



**Fig. 2: Sagittal CT scan of the lumbar spine: Bilateral hypoplasia of the inferior articular process of L3**



**Fig. 3: 3D reconstruction: Bilateral cleft at the level of the inferior articular process of L3**



**Fig. 4: 3D Reconstruction: Bilateral cleft at the level of the inferior articular process of L3 and supernumerary ossicle at the level of the spinous process of L4**

## DISCUSSION

Albert Oppenheimer first described this ossicle in 1942 as a "supernumerary ossicle of the neural arch" (4). This ossicle results from a failure of fusion of a secondary ossification center located at the end of the articular process. It is important to distinguish the unfused or ununited accessory spinous ossicle from spina bifida occulta, which refers to a space in the fusion of the neural arch.

The incidence of orthotopic osteomas (OOs) is estimated at approximately 13% in cadaveric studies (5). In 20% of cases, these anomalies are multiple or bilateral (6). OOs are more frequent in the lumbar spine, with a predilection for the distal end of the inferior articular process of vertebrae L2 or L3 [1, 2]. In our case, it was a bilateral malformation affecting L2.

The association between the neural arch variant has been described, but no cases of ossicles. Bilateral Oppenheimer's defects with an ossicle with an unfused spinous process have not been reported.

Supernumerary ossicles are usually asymptomatic, but can become painful following fractures, dislocations, degenerative lesions, osteonecrosis, osteoarthritis, osteochondral lesions, avascular necrosis, tumors, or irritation or compression of adjacent soft tissues [1-3]. Failure of an ossification center to unite results in a radiolucent space on radiographic examination due to the persistence of cartilaginous layers. Summers pointed out that supernumerary ossicles can be mistaken for fractures [7].

Standard X-rays may show a radiolucent cleft; what our reveals case. Computed tomography (CT) is the preferred diagnostic tool, and it describes findings suggestive of an ossicle fracture: rounded contours, a regular and well-defined cortex, the absence of an

irregular fracture line, and no displacement. Conversely, an acute fracture presents irregular, non-corticalized edges. MRI can identify bone marrow edema and assess any potential spinal stenosis [18]. It is generally reserved for patients with neurological signs [9]. SPECT/CT can help differentiate an active defect of the pars interarticularis from a developmental ossicle [10, 11].

In our case, the presence of a regular cortex and the absence of bone marrow edema allowed us to exclude an acute fracture and the patient received a diagnosis of Oppenheimer's ossicle.

Secondary ossification centers of the spinous process can easily be mistaken for an avulsion fracture. However, certain features allow differentiation between a non-union spinous process and a fracture: first, the opposite margins are regular and sclerotic; second, the detached ossicle remains in place, without caudal displacement; and finally, the cranial border of the ossicle is concave. Our case confirmed these details on CT scan examination and formally ruled out an avulsion fracture.

## CONCLUSION

In the context of minor trauma, it is incorrect to consider anatomical variations and developmental anomalies as fractures. Understanding the possible pathologies of these unfused ossicles allows for a more accurate diagnosis and can prevent radiologists from making a potentially dangerous error. Indeed, the association of an Oppenheimer's ossicle with an unfused accessory spinous process constitutes a complex and exceptional case. Recognizing the characteristics Morphological features in CT scans are essential to avoid diagnostic errors and inappropriate management.

## REFERENCES

1. Bajara I, Altay C, Gezer S, Balçı A. Evaluation of an unusual ossicle by multidetector computed tomography: the Oppenheimer ossicle. *Acta Orthopédie Traumatologie Turc* [Internet] 2015;49:331–3. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26200415>.
2. Kumar DS, Fotiadou A, Lalam R, Ginder LM, Eisenstein SM, Tins BJ, et al. Lumbar facet joint ossicles: normal variant or spondylolytic variant? *Skeletal Radiol* 2012;41:1559–66.
3. Kofod S, Boll K. Abnormal ossicle in a lumbar facet joint. *Arch Orthop Trauma Surg* 1987;106:333–4. Internet. Available from <http://www.ncbi.nlm.nih.gov/pubmed/2957976>.
4. Oppenheimer A. Supernumerary ossicle at the isthmus of the neural arch. *Radiology* 1942;39:98 – 100.
5. Wang ZL, Yu S, Sether LA, Haughton VM. Incidence of unfused ossicles in lumbar facet joints: a study by computed tomography, MRI and cryomicrotomy. *J Comput Assist Tomogr* [Internet]. 13: 594–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2745776>.
6. Pech P, Haughton VM. CT appearance of the unfused ossicles of the lumbar spine. *Am J Neuroradiol* 1985;6:629–31.
7. Hipps HE. Formation of fissures in the articular processes of the lumbar vertebrae. *J Bone Jt Surgeon* 1939;21:289.
8. Campbell RSD, Grainger AJ, Hide IG, Papastefanou S, Greenough CG. Juvenile spondylolysis: comparative analysis of computed tomography, single-photon emission computed tomography and magnetic resonance imaging. *Skeletal Radiol* 2005;34:63-73. [Internet]. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/15668821>.
9. Patel ND, Broderick DF, Burns J, Deshmukh TK, Fries IB, Harvey HB, et al. ACR suitability criteria for low back pain. *J Am Coll Radiol* 2016;13:1069–78. [Internet]. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/27496288>.
10. Matesan M, Behnia F, Bermo M, Vesselle H. SPECT/CT bone scintigraphy for the evaluation of low back pain in young athletes: common and rare etiologies. *J Orthop Surg Res* [Internet]. *Journal of Orthopaedic Surgery and Research* 2016;11:1–9. Available from: <https://doi.org/10.1186/s13018-016-0402-1>. [15] Gaddikeri S, Matesan M, Alvarez J, Hippe DS, Vesselle HJ. MDP- SPECT versus hybrid MDP-SPECT/CT in the evaluation of suspicious pars interarticularis fracture in young athletes. *J Neuroimaging* 2018;28:635–9. [Internet]. Available at: <http://doi.wiley.com/10.1111/jon.12533>.
11. Trout AT, Sharp SE, Anton CG, Gelfand MJ, Mehlman CT. Spondylolysis and beyond: value of SPECT/CT in evaluation of low back pain in children and young adults. *Radiographics* 2015;35:819-34. Available on the Internet: <http://www.ncbi.nlm.nih.gov/pubmed/25969937>.