

# Extreme Elongation of the Transverse Processes of the Fifth Lumbar Vertebra: An Unusual Variant

## *Beşinci Lomber Omur Transvers Çıkıntısının Aşırı Uzaması: Alışılmadık Bir Varyasyon*

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### ABSTRACT

The fifth lumbar vertebra has massive transverse processes that are continuous with the pedicle and encroach the body of the vertebra. These processes are mainly meant for the attachment of the iliolumbar ligament. With increasing age, the iliolumbar ligament can undergo secondary degenerative changes such as calcification, hyalinization, and myxoid degeneration. The authors present the incidental discovery of extremely elongated transverse processes of the fifth lumbar vertebra in a 45-year-old woman who underwent surgery for an intervertebral disc herniation. We also propose a possible pathogenesis to explain this rare condition and conclude that this unusual variant may be caused by calcification of the iliolumbar ligament rather than a congenital anomaly.

**KEYWORDS:** Lumbar vertebra, Transverse process, Iliolumbar ligament, Calcification

### ÖZ

Beşinci lomber omur pedikülle devamlılık gösteren ve omur gövdesine uzanan büyük bir transvers çıkıntıya sahiptir. Bu çıkıntılar temelde ileolomber ligamanın yapışması içindir. Yaşın ilerlemesiyle ileolomber ligaman kalsifikasyon, hyalinizasyon, ve miksoid dejenerasyon gibi sekonder dejeneratif değişikliklere uğrayabilir. Yazarlar bir intervertebral disk herniasyonu nedeniyle ameliyat edilen 45 yaşında bir kadında beşinci lomber omurun transvers çıkıntısının aşırı uzamış olmasının tesadüfen bulunmasını sunmaktadırlar. Bu nadir durumu açıklamak için muhtemel bir patogenez de öne sürüyoruz ve bu alışılmadık varyasyonun konjenital bir anomaliden ziyade ileolomber ligamanın kalsifikasyonu nedeniyle de olabileceğini düşünüyoruz.

**ANAHTAR SÖZCÜKLER:** Lomber omur, Transvers çıkıntı, İleolomber ligaman, Kalsifikasyon

### INTRODUCTION

The transverse processes of the L5 vertebra are stout, short, and pyramidal and may be fused with the lateral part of the sacrum. These processes are mainly meant for the attachment of the iliolumbar ligament (1). Quantitative studies on the transverse process width (TPW) of the human vertebra have found that the TPW of the L5 vertebra of Chinese Singaporeans is about 71.3 mm, which is 22.9% shorter than that of the Europeans (TPW = 92.5 mm) (3,5). Here, we report the incidental discovery of extremely elongated transverse processes of the L5 vertebra in a 45-year-old woman who underwent surgery for an intervertebral disc herniation at the level of L4-L5. We also propose a possible pathogenesis to explain this rare condition.

### CASE REPORT

A 45-year-old woman presented with a 3-day history of pain in the lower back and right leg along the L5 dermatome; the pain commenced immediately after she lifted a heavy flowerpot at her home. The results of neurological examinations were as

follows: straight leg raising (SLR) test on right leg was positive at 45°; weakness of the right extensor hallucis longus; manual motor test rating of 4/5; and a decrease of the right medial hamstring tendon reflex. Plain anteroposterior radiography of the lumbar spine revealed marked elongation of the transverse processes of L5 and a calcified nodular lesion in the left pelvic cavity, which suggested the presence of a calcified uterine myoma (Figure 1A). A three-dimensional (3D)-reconstructed computed tomography (CT) scan of the pelvis revealed that the TPW was about 132 mm, and the tips of the transverse processes were sharp with irregular margins (Figure 1B). The presence of an intervertebral disc herniation at the level of L4-L5 on the right side was also noted. Magnetic resonance imaging (MRI) revealed a large, extruded intervertebral disc on the right side, which compressed the dural sac and nerve root (Figure 2). The patient underwent unilateral partial hemilaminectomy of L5 and discectomy at the level of L4-L5 under microscopic magnification. The postoperative course was uneventful, and all the initial symptoms of the patient disappeared completely.



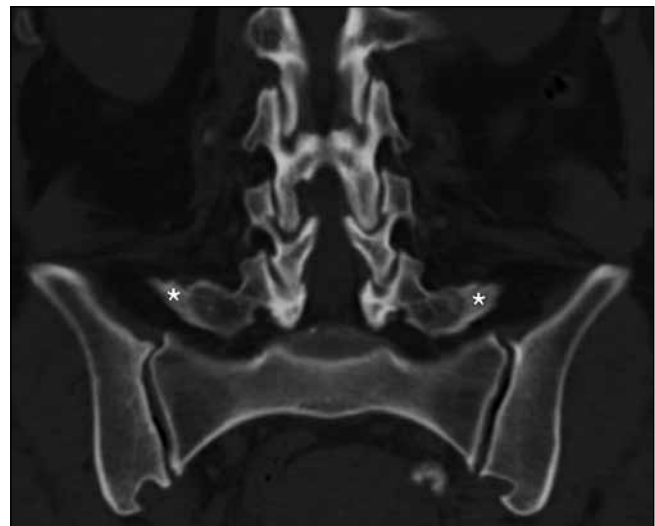
**Figure 1:** **A)** Plain anteroposterior radiography of the lumbar spine reveal marked elongation of the transverse processes of the L5 vertebra and a calcified nodular lesion in the left pelvic cavity, suggesting the presence of a calcified uterine myoma. **B)** A three-dimensional (3D)-reconstructed computed tomography (CT) scan of the pelvis reveals that the transverse process width (TPW) is about 132 mm, and the tips of both the transverse processes are sharp with irregular margins.



**Figure 2:** Magnetic resonance imaging (MRI) reveals a large, extruded intervertebral disc on the right side, compressing the dural sac.

### DISCUSSION

The fifth lumbar vertebra has certain remarkable features that facilitate its role in load transmission from the vertebra to the sacrum (4). This vertebra has massive transverse processes that are continuous with the pedicle and encroach the body of the vertebra. The body is usually the largest and markedly deeper anteriorly, thus contributing to the lumbosacral



**Figure 3:** Computed tomography (CT) scan of the pelvis with bone window settings reveals that the trabecular bone of the transverse processes have normal shape and length, and the compact bone (asterisk) is elongated.

angle (6). The lower border of the transverse process of the L5 is angulated and passes laterally and then superolaterally to end in a blunt tip (6). On the basis of a quantitative analysis, Tan et al. (5) reported that the TPW of the L5 vertebra was  $71.3 \pm 2.5$  mm; however, the TPW of our patient was approximately 132 mm, which is almost 60.7 mm longer than the values reported previously. To the best of our knowledge, this is the first reported case of extreme elongation of the transverse processes of the L5 vertebra. Two theories have been proposed for the pathogenesis of this condition. First, the condition may have been congenital. Second, we also inferred that the iliolumbar ligament was calcified on the basis of the

fact that the direction of elongation of the transverse process corresponded to the position of the iliolumbar ligament. The iliolumbar ligament is attached to the tip and the anteroinferior aspect of the transverse processes of the fifth lumbar vertebra (6). The ligament runs laterally and slightly posteriorly and inserts into the top of the iliac crest (4). Luk et al. (2) have reported that the iliolumbar ligament does not exist at birth, but develops gradually in the first decade and attains full differentiation only in the second decade. With increasing age, the ligament can undergo secondary degenerative changes such as calcification, hyalinization, and myxoid degeneration (2). These secondary degenerative changes mostly occur after the sixth decade, and our patient was in the fifth decade. Furthermore, a CT scan of the pelvis with bone window settings revealed that the trabecular bone of the transverse processes had normal shape and length, and the compact bone was elongated (Figure 3). If elongation of the transverse process had been present congenitally, then the trabecular bone must have connected to a more distal aspect of the transverse process, and the tip of the transverse process must have been blunter than observed. Therefore, we conclude that this unusual variant may be a result of iliolumbar ligament calcification rather than a congenital anomaly.

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