Received: 12.11.2009 / **Accepted:** 13.01.2010

Existence of Two Separate Facet Joints on the Same Side: Case of a Congenital Anomaly

İki Ayrı Faset Eklemin Aynı Tarafta Bulunması: Konjenital Anomalili Bir Vaka

Murat KUTLAY[1], Berker CEMIL[1], Kivanc TOPUZ[1], Mehmet Nusret DEMIRCAN[1], Zafer KUCUKODACI[2]

[1]Haydarpasa Training Hospital, Gulhane Military Medical Academy, Department of Neurosurgery, Istanbul, Turkey
[2]Haydarpasa Training Hospital, Gulhane Military Medical Academy, Department of Pathology, Istanbul, Turkey

Correspondence address: Berker CEMIL / E-mail: berker5@yahoo.com

ABSTRACT

We present a case that had two separate facet joints on the same side causing an intervertebral instability. The embryological pathogenesis of the congenital existence of two separate facet joints on the same side of the vertebra is not conclusively known. A 68-year-old woman presented with lower back pain and severe left leg pain. Neuroradiological evaluation including dynamic plain radiography, computed tomography, and magnetic resonance imaging of the lumbar spine revealed the existence of two separate facet joints on the same side of the first sacral vertebra, severe degenerative changes of both right and left L5-S1 facet joints, and Grade II L5-S1 spondylolisthesis. Subsequently, she underwent surgery. Intraoperatively, two separate facet joints on the same side of the first sacral vertebra were confirmed. The patient's symptoms were resolved after decompression and fusion surgery. This is a unique case of the congenital existence of two separate facet joints on the same side of the first sacral vertebra.

KEYWORDS: Congenital anomaly, Facet joint, Instability, Sacral vertebra

ÖZ

İki ayrı faset eklemin aynı tarafta bulunması nedeniyle vertebral instabilite gelişen bir vaka sunulmuştur. Konjenital olarak vertebranın aynı tarafında iki ayrı faset eklemin bulunmasının embriyolojik patogenezi tam olarak bilinmemektedir. 68 yaşında kadın bel ağrısı ve şiddetli sol bacak ağrısı ile başvurmuştur. Nöroradyolojik incelemelerinde, lumbosakral vertebranın dinamik düz grafileri, bilgisayarlı tomografi görüntüleri ve manyetik rezonans görüntüleri incelenmiş olup birinci sakral vertebranın aynı tarafında iki ayrı faset eklemin bulunduğu, L5-S1 bilateral faset eklemlerinde şiddetli dejeneratif değişikliklerin bulunduğu ve Grade II L5-S1 spondilolistezis saptanmıştır. Takiben hasta opere edilmiştir. Operasyonda birinci sakral vertebranın aynı tarafında iki ayrı faset eklemin bulunduğu görülmüştür. Hastanın semptomları dekompresyon ve füzyon ameliyatı sonrasında düzelmiştir. Vakamız birinci sakral vertebranın aynı tarafında iki ayrı faset eklemin bulunduğu bildirilmiş olan tek vakadır.

ANAHTAR SÖZCÜKLER: Konjenital anomali, Faset eklem, Instabilite, Sakral vertebra

INTRODUCTION

The existence of two separate facet joints on the same side is a rare congenital spine anomaly. Because of its rarity, this anomaly has a high potential for radiographic misinterpretation and misguided clinical intervention (3,6). In addition, it may be associated with other osseous anomalies (10,11). Reported bony anomalies include congenital absence or hypoplasia of the pedicle (8).

Although many congenital anomalies can be diagnosed by plain radiography, other imaging studies and especially computed tomography and magnetic resonance imaging should be performed in order to accurately evaluate the radiological findings and to plan the operation. The present patient is the first case in which existence of two separate facet joints on the same side of the first sacral vertebra has been documented.

CASE REPORT

A 68-year-old woman presented with a 4-month history of low back pain and severe left leg pain. There was no history of any trauma or surgery. Physical examination revealed hypoesthesia on the left S1 root dermatome, significant weakness of the left tibialis anterior and extensor hallucis longus muscles, and positive left straight leg raising at 45°. Dynamic plain radiographies of the lumbar-sacral spine revealed the existence of two separate facet joints on the same side of the first sacral vertebra, severe degenerative changes of both right and left L5-S1 facet joints, and Grade II L5-S1 spondylolisthesis (Figure 1A,B). Computed tomography

confirmed the existence of two separate facet joints on the same side of the first sacral vertebra, and hypertrophy of both right and left L5-S1 facet joints (Figure 2A,B). Magnetic resonance imaging showed severe degeneration of L2-L3, L3-L4, L4–L5 and L5–S1 intervertebral discs but did not show herniated nucleus pulposus or other osseous abnormalities. Subsequently, she underwent surgery. Intraoperatively, two separate facet joints on the same side of the first sacral vertebra were confirmed (Figure 3). After a carefully exposition and protection of bilateral S1 roots, pedicle screw fixation and fusion were performed. During the surgery, we noted compression of the left S1 nerve root by the hypertrophic L5 inferior articular process and S1 superior articular process but did not observe any abnormality of the dural sac or nerve roots at the L5–S1 level. Pathological examination of the specimen confirmed the diagnosis of articular cartilage (Figure 4). Postoperatively, the patient's symptoms completely resolved.

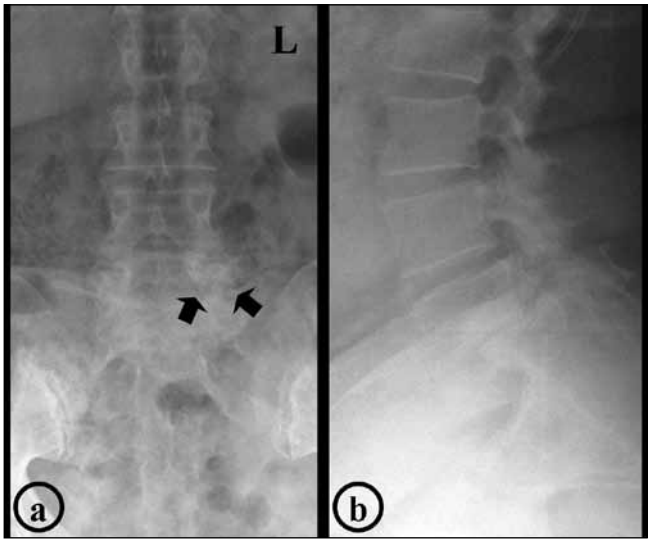

Figure 1: A) Anteroposterior radiograph of the lumbosacral spine shows existence of two separate facet joints on the same side (black arrows); **B)** Lateral radiograph of lumbosacral spine shows Grade II L5-S1 spondylolisthesis.

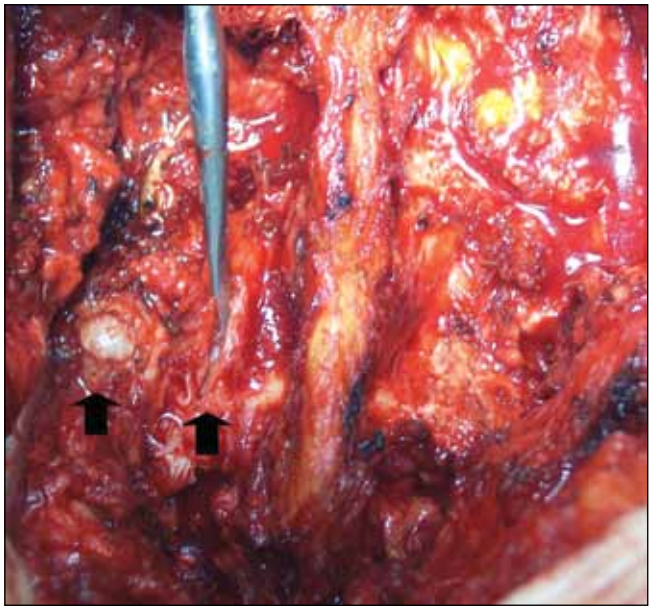

Figure 3: Intraoperative photograph showing the existence of two separate facet joints on the same side (black arrows).

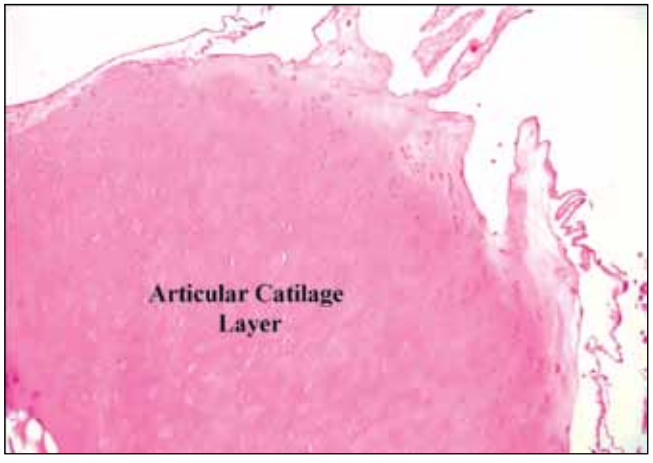

Figure 4: Photomicrograph depicting a tissue section obtained from the separate facet joint. The cartilage tissue was noted. Haematoxylin and Eosin X 40.

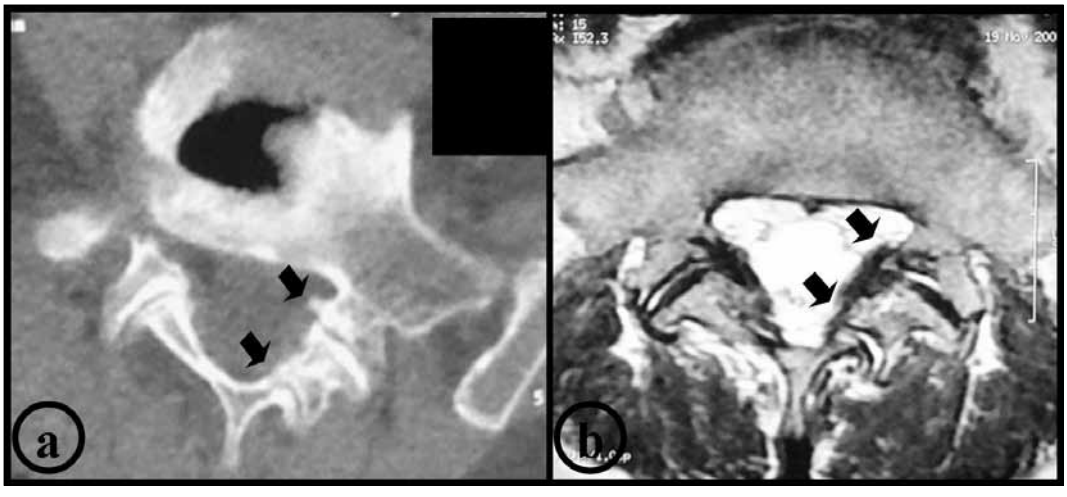

Figure 2: Axial computed tomography scan **A)** and axial t2 weighted sagittal magnetic resonance imaging **B)** through first sacral vertebral body illustrating the existence of two separate facet joints on the same side (black arrows).

DISCUSSION

Congenital bony anatomical defects and variations are uncommon anomalies. The embryological pathogenesis of the congenital existence of two separate facet joints on the same side of the vertebra is not conclusively known. Spine formation and development take place by migration, segmentation, and chondrification by the gestational age of 4 weeks. Within 7 weeks of gestation, the chondrification centers are established; ossification of the centrum and lamina follow by 9 weeks (1). The vertebral level forms from six separate chondrification foci, i.e., two for the vertebral bodies, two for the pedicles, lateral masses, and transverse processes, and two for the laminae and spinous processes. Either failure of development of a vertebral chondrification center for the posterior arch of a particular sclerotome or failure of appropriate ossification could lead to the absence of a pedicle, the ventral half of the lateral mass, and the dorsal part of the transverse process (1). Such a developmental anomaly probably develops at the gestational age of 7 to 9 weeks (1,2,7).

Congenital facet disorders are typically asymptomatic. However, these anomalies may be incidentally noted during a routine radiographic examination or after radiographs are obtained following trauma (4). Radiographic evaluation of these patients typically begins with conventional radiography but frequently includes CT, myelography, and magnetic resonance imaging (8). In our case, preoperative radiological investigation was performed according to the literature and showed narrowing of the spinal canal and neural foramen which causes pressure on the spinal nerves secondary to the anomalous facet joint.

In the differential diagnosis, we considered that this could be a new formed articulation or pseudarthrosis following a trauma; a postoperative change; a small congenital lamina defect with a "neoarthrosis" or pseudarthrosis; and a spondylolisis or a spondylolisthesis with a "neoarthrosis" at the isthmic / dysplastic defect. The first two etiologies were found to be inconsistent with the findings because the patient did not have a trauma or surgery history. In addition, the pathological diagnosis of articular cartilage had made a diagnosis of "neoarthrosis" or pseudarthrosis unlikely.

The bony and neural anatomical anomalies in our patient were noted on preoperative imaging and confirmed intra-operatively. No other osseous abnormalities, including spina bifida occulta or vertebral bony fusions were found. This type of facet anomaly may easily cause confusion during pedicle screwing. Knowledge of the entrance point has utmost importance to ensure safe pedicle screw placement. Otherwise, severe complications, such as pedicle breakage, and neural, vascular, and visceral injuries may occur.

In 1992, Ikeda et al. reported three cases of a lumbosacral facet defect in three young women (5). They suggested an intervertebral instability caused by these defects to be the cause of the low back pain. Kusakabe et al., in 2001, reported four symptomatic cases of congenital absence of the lumbar articular process (9). Three of these patients had radiating pain, which improved after decompression with posterolateral lumbar fusion. The mechanism of low back pain in these patients was suggested to be a microfracture of the hypertrophic facet joint, caused by a concentration of stresses. In the present case, the neurological signs were compatible with the literature. In addition, the patient's complaints were resolved after decompression and fusion surgery.

In conclusion, we report a unique case that has two separate facets on the same side of the first sacral vertebra. Young neurosurgeons unfamiliar to this type of malformation can misdiagnose it as a fracture, dislocation, or other osseous abnormality. Computed tomography scans coupled with plain films can facilitate accurate diagnoses. Our patient's complaints were resolved after decompression and fusion surgery.

REFERENCES

1. Archer E, Batniztky S, Franken EA, Muller J, Hale B: Congenital dysplasia of C2--6. Pediatr Radiol 6:121-122, 1977
2. Cox HE, Bennett WF: Computed tomography of absent cervical pedicle. J Comput Assist Tomogr 8:537-539, 1984
3. Hanson EC, Shook JE, Wiesseman GJ, Wood VE: Congenital pedicle defects of the axis vertebra. Report of a case. Spine 15:236-238, 1990
4. Harrop JS, Jeyamohan S, Sharan A, Ratliff J, Flanders A, Maltenfort M, Falowski S, Vaccaro A: Acute cervical fracture or congenital spinal deformity? J Spinal Cord Med 31:83-87, 2008
5. Ikeda K, Nakayama Y, Ishii S: Congenital absence of lumbosacral articular process: Report of three cases. J Spinal Disord 5:232-236, 1992
6. Rodríguez-Romero R, Vargas-Serrano B, Carro-Martínez A: Congenital absence of the neural arch in the cervical spine: An extreme form of pedicle absence. Eur J Radiol 20:100-104, 1995
7. Schwartz AM, Wechsler RJ, Landy MD, Wetzner SM, Goldstein SA: Posterior arch defects of the cervical spine. Skeletal Radiol 8: 135-139, 1982
8. Sheehan J, Kaptain G, Sheehan J, Jane J Sr: Congenital absence of a cervical pedicle: Report of two cases and review of the literature. Neurosurgery 47:1439-1442, 2000
9. Takashi K, Katsumi's, Fumio K: Congenital absence of lumbar articular process; Report of four cases. Orthopaedic Surgery and Traumatology 44:1321-1328, 2001
10. Tebbal MR, Ben Romdhane MH, Montagne JP, Ducou le Pointe H, Lipszyc H: What is it? Congenital absence of the left pedicle of C7 vertebra. J Radiol 79:1509-1512, 1998
11. Wiener MD, Martinez S, Forsberg DA: Congenital absence of a cervical spine pedicle: clinical and radiologic findings. AJR Am J Roentgenol 155:1037-1041, 1990