

## CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

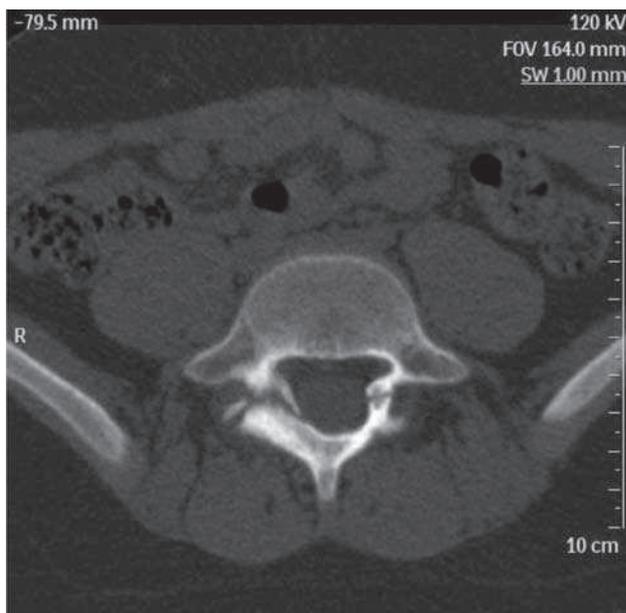
### Medical Imaging Quiz – Case 19

A 9 year-old girl presented with intermittent right low back pain in the outpatient orthopedic clinic of our hospital. Physical examination revealed tenderness with palpation of right lower paraspinal region. Her guardian mentioned that the girl was systematically twirling a hula hoop toy around her waist, during the last month. Plain X-rays were inconclusive and due to high clinical suspicion for spondylolysis the girl was referred to the computed tomography (CT) department for imaging of L4–S1 vertebrae.

CT of L4 to S1 vertebrae showed bilateral defects of pars interarticularis of L5 vertebra (fig. 1). In particular on the right side, hypertrophied lesions were also observed; the margins of the defect were irregular and sclerotic, whereas on the left side it had regular margins. Oblique images also verified the presence of perpendicular defects to the axis of facet joints (figures 2, 3).

#### Comment

*Spondylolysis is a defect through the pars interarticularis and its etiology remains uncertain; repeated mechanical stress with micro-*



**Figure 1.** Axial view at the level of L5. Bilateral defects of pars interarticularis. Of note, the hypertrophy of pars interarticularis on the right side.

ARCHIVES OF HELLENIC MEDICINE 2011, 28(4):569–570  
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2011, 28(4):569–570

**T.N. Spyridopoulos,  
N. Stratigopoulou,  
N. Evlogias**

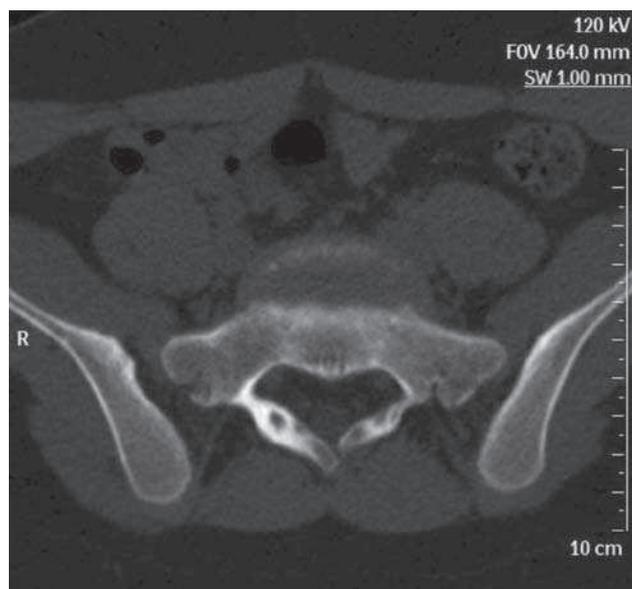
*Department of Radiology, Penteli  
Children's Hospital, Palea Penteli, Greece*



**Figure 2.** Oblique parasagittal view at the level of left pars interarticularis of L3–L5 vertebrae. Defect of left pars at L5 level, with regular margins.



**Figure 3.** Oblique parasagittal view at the level of right pars interarticularis of L3–L5 vertebrae. Defect of right pars at L5 level, with irregular margins.



**Figure 4.** Spina bifida occulta at the level of S1.

trauma rather than a single traumatic event have been suggested to play a role in the development of spondylolysis. Its incidence is about 5% among children (especially adolescent athletes or those with leisure time sport activities) and 6% among the general population. It typically presents with low back pain, usually among youths. Approximately 95% of cases occur at L5 level; rarely it has multilevel involvement. Spondylolysis is more frequently observed in patients with spina bifida occulta, which was also verified in our patient (fig. 4). The morphology of spondylolysis simulates the adjacent facet joints; thus, the first impression when viewing the axial slices of affected spine is that of "too many facets". Facet joints usually have regular cortical defects in contrast to the pars defects.

The initial imaging for suspected spondylolysis consists of X-rays of lumbar spine; however, plain X-rays usually fail to detect stress reactions in the pars interarticularis that have not resulted

in a complete fracture. In case of acute onset of pain, magnetic resonance imaging (MRI) is ideal for detecting bone marrow edema in the affected pars interarticularis. When the pain symptoms are chronic, CT is an alternative imaging method for evaluating the bony structures and identifying pars defects. Additional CT findings may involve bony hypertrophy at the affected site or stress microfractures of trabecular bone.

## References

1. WILTSE LL, WIDELL EH Jr, JACKSON DW. Fatigue fracture: The basic lesion is inthmic spondylolisthesis. *J Bone Joint Surg Am* 1975, 57:17–22
2. GARRY JP, McSHANE J. Lumbar spondylolysis in adolescent athletes. *J Fam Pract* 1998, 47:145–149
3. BLANDA J, BETHEM D, MOATS W, LEW M. Defects of pars interarticularis in athletes: A protocol for nonoperative treatment. *J Spinal Disord* 1993, 6:406–411
4. FREDRICKSON BE, BAKER D, McHOLICK WJ, YUAN HA, LUBICKY JP. The natural history of spondylolysis and spondylolisthesis. *J Bone Joint Surg Am* 1984, 66:699–707
5. LEE J, EHARA S, TAMAKAWA Y, SHIMAMURA T. Spondylolysis of the upper lumbar spine. Radiological features. *Clin Imaging* 1999, 23:389–393
6. SAIRYO K, KATOH S, TAKATA Y, TERA I, YASUI N, GOEL VK ET AL. MRI signal changes of the pedicle as an indicator for early diagnosis of spondylolysis in children and adolescents: A clinical and biomechanical study. *Spine (Phila Pa, 1976)* 2006, 31:206–211
7. HESSION PR, BUTT WP. Imaging of spondylolysis and spondylolisthesis. *Eur Radiol* 1996, 6:284–290

Corresponding author:

T.N. Spyridopoulos, Department of Radiology, Penteli Children's Hospital, Palea Penteli, Greece  
tel.: +30 2132052569  
e-mail: thspyrid@med.uoa.gr