Case Study: Three Level Spondylolysis in a contortionist

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Patient History

A 21 year old female contortionist presented with acute back pain following a contortion maneuver: History was significant for 13 years of contortion training and practice. The patient was imaged at Nevada Imaging Centers using 3T MRI and CT.

Initial Imaging

CT axial slices at the level of L3 confirmed laminar fracture and bone fragment. These findings were left to represent the patient’s acute symptoms.

Further Imaging

3D reconstruction and analysis using Mimics reconstructive modeling software and a Z-Corp Spectrum Z-510 powder deposition rapid prototyping system was utilized to create 3D medical scale modeling of the lumbar spine.

Sagittal 3D and life size medical scale modeling more fully illustrate the L1, L2, L3 three level spondylolysis.

Sagittal CT reformations of the right and left spine respectively demonstrated bilateral pars defects at L1, L2, L3. Anterior and posterior SPECT imaging performed with dual head gamma camera were negative at these levels confirming this unique 3 level spondylolysis finding was a non-acute incidental finding.

Discussion

Twenty-four cases of three level bilateral spondylolysis were identified in the literature. No cases were of the first three lumbar vertebrae. Subsequent spondylolysis of the affected levels followed by surgery was common. Our patient has since resumed the full practice of contortion pain free.

Spondylolysis is generally thought to be a developmental condition¹, although acute spondylolysis is common in adolescent populations and athletes². Siler and Calders and Rossi and Dragoni found higher rates of spondylolysis in certain athletes such as Intrapine (10%), gymnastics (27%), wrestling (29%), weightlifting (25%) and competitive diving (40%)³, as compared to the general population rate of 5.6%⁴ and 8-14% in athletes⁵,⁶,⁷.

Only one modern study has examined injuries in contortionists, which postulated a increased incidence of limbus vertebrae⁸.

Given the striking asymptomatic 3 level spondylolysis in this patient, contortionists considering surgery for treatment and we query whether these fractures may even be increasing in these elite athletes.

3D and life size medical scale modeling can assist in characterizing the diagnosis in complex and challenging cases.

REFERENCES