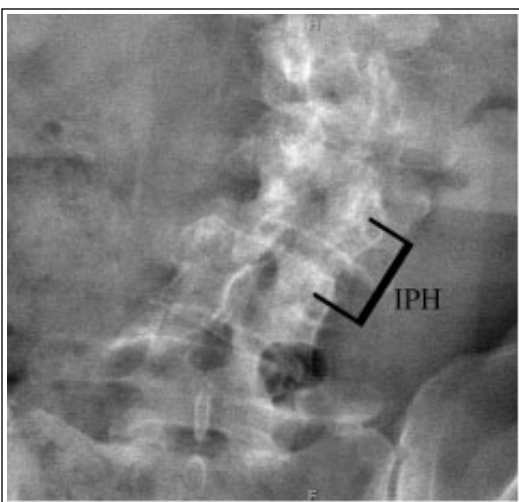


Introduction: Spine surgeons correlate clinical presentation with radiographic findings in a patient-tailored approach. Despite the prevalence of adult degenerative scoliosis (ADS), there are few radiographic markers to predict presence of radiculopathy. Emerging data suggest that spondylolisthesis, obliquity, foraminal stenosis and curve-concavity may be associated with radiculopathy in ADS. The purpose of this study was to determine if radiculopathy in ADS is associated with reduced interpedicular heights (IPHs) measured on routine radiographs.

Figure 1. IPHs were measured for each level from L1 to S1. Bilateral IPHs were measured on anterior-posterior radiographs from the centers of the rostral caudal pedicles.



Methods: Retrospective chart review was performed in ADS patients referred to scoliosis surgeons. Inclusion criteria included patients with ADS and no prior thoracolumbar-surgery. Data were collected from initial spine surgeon clinic notes and radiographs. Clinical outcome data included presence, side(s) and level(s) of radiculopathy; presence of motor deficits; and presence of sensory deficits. Variables included age, gender, SRS-30 and Oswestry Disability Index (ODI) questionnaire data, and radiographic measurements. Radiographic measurements included Cobb angles and L1-S1 IPHs on upright and supine radiographs. Associations were assessed with univariate and multivariate statistical analyses.

Results: Average age of patients that met inclusion criteria was 51-years. Increased age was associated with radiculopathy, weakness and sensory deficits. Patients that were 55-years or older were approximately 8 times more likely to have a radiculopathy, 5 times more likely to have a motor deficit, and 5 times more likely to have a sensory deficit than those younger than 55. Caudally-located nerve roots are more likely to develop radiculopathy. Motor deficits were associated with worse SRS-30 functional and ODI scores, but radicular pain and sensory deficits were not associated with lower SRS-30/ODI scores. Finally, radiculopathy was associated with reduced IPH in both supine and upright radiographs.

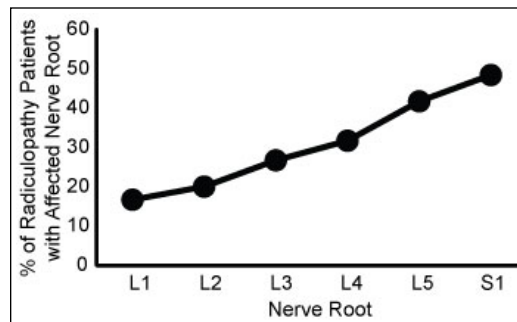
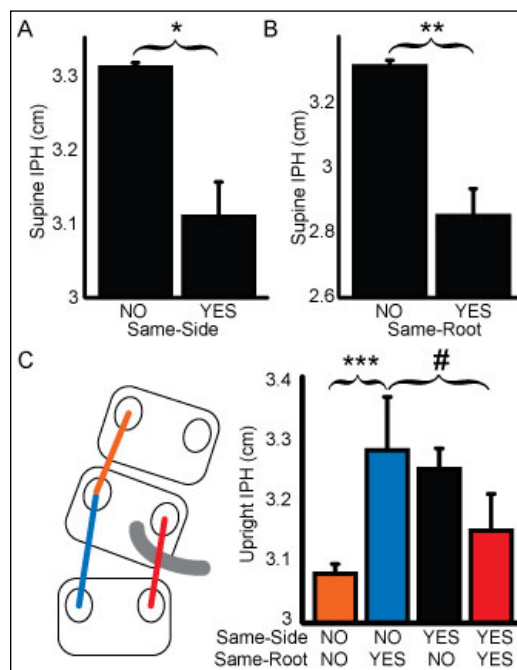


Figure 2. Prevalence of lumbar radicular pain for each level in adult degenerative scoliosis. The prevalence of radicular pain at each level is shown among 60 patients with radicular pain. The probability of a radicular pain increased for caudal nerve roots (Cochran-Armitage test for linear trend, $p < 0.0001$).



Conclusions: Radiculopathy in ADS patients is associated with reduced IPHs and increased age. Measuring IPHs on routine radiographs may be helpful in associating clinical radiculopathy with radiographic measures to guide patient management and surgical planning.

Figure 3. Radicular pain in ADS was associated with reduced IPHs. (A) Supine IPH was smaller when there was radicular pain on the same side; $*p = 0.002$. (B) Supine IPH was smaller when there was radicular pain measured at that same nerve root level ($**p = 0.0002$). (C) Radicular pain was associated with reduced IPHs on upright radiographs. Illustration (left) describes anatomical location of a radicular pain (grey) relative to 3 IPH measurements: IPH at the same side and level (red), IPH at the same level but contralateral side (blue), and IPH at a different level and contralateral side (orange). On upright radiographs, there was a significant interaction between side and root level ($p = 0.01$). IPHs with radicular pain at the same level and on the same side was significantly smaller than IPHs at the same level but opposite side ($\#p = 0.04$, red vs. blue). IPHs at the opposite side but same level were significantly larger than IPHs at different levels and sides ($***p = 0.03$, blue vs. orange). Analyses were performed with GSE. $N_{\text{supine}} = 1230$. $N_{\text{upright}} = 2000$ IPHs.