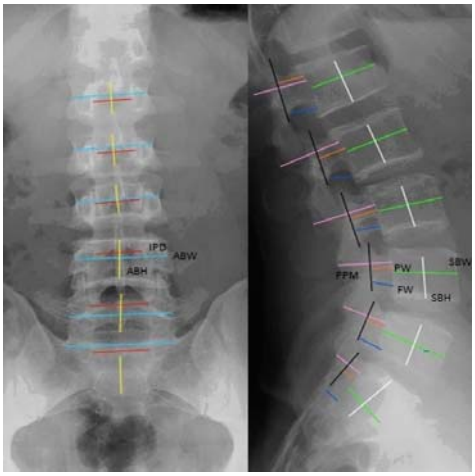
# GP196

## RADIOGRAPHIC INDICES FOR LUMBAR DEVELOPMENTAL SPINAL STENOSIS

**Jason Pui Yin Cheung[1], Karen Ka Man Ng[1], Prudence Wing Hang Cheung[1], Dino Samartzis[1], Kenneth MC Cheung[1]**
*1. The University of Hong Kong, /, Hong Kong*

**Introduction:** Patients with developmental spinal stenosis (DSS) are susceptible to developing symptomatic stenosis due to pre-existing narrowed spinal canals. DSS has been previously defined by MRI via the axial anteroposterior (AP) bony spinal canal diameter. However, MRI is hardly a cost-efficient tool for screening patients. X-rays are superior due to its availability and cost but currently, there is no definition of DSS based on plain radiographs. Thus the aim of this study is to develop radiographic indices for diagnosing DSS.

**Methods:** This was a prospective cohort of 148 subjects consisting of patients undergoing surgery for lumbar spinal stenosis (patient group) and asymptomatic subjects recruited openly from the general population (control group). Ethics approval was obtained from the local institutional review board. All subjects underwent MRI for diagnosing DSS and radiographs for measuring parameters used for creating the indices. All subjects underwent lumbar AP and lateral standing radiographs of the lumbosacral spine (**Figure**). For MRI, the midline AP bony spinal canal diameter was used to diagnose DSS (L1<20mm, L2<19mm, L3<19mm, L4<17mm, L5<16mm, S1<16mm). All measurements were performed by two independent investigators, blinded to patient details. Intra- and inter-observer reliability analyses were conducted and only parameters with near perfect intraclass correlation underwent receiver operating characteristic (ROC) analysis to determine the cut-off values for diagnosing DSS using radiographs.




**Results:** Imaging parameters from a total of 66 subjects from the patient group and 82 asymptomatic subjects in the control group were used for analysis. ROC analysis suggested sagittal vertebral body width to pedicle width ratio (SBW:PW) as having the strongest sensitivity and specificity for diagnosing DSS. Cut-off indices for SBW:PW were level-specific: L1 (2.0), L2: (2.0), L3: (2.2), L4: (2.2), L5: (2.5), S1 (2.8). The highest sensitivity was 0.92 and highest specificity was 0.99 for all the levels.

**Discussion:** This is the first study to define DSS on plain radiographs based on comparisons between a clinically relevant patient group and a control group. Individuals with DSS can be identified by a simple radiograph using a screening tool allowing for better cost-saving means for clinical diagnosis or research purposes.

**Figure:** On the AP view (left), the interpedicular distance (IPD) and axial vertebral body height (ABH) and width (ABW) were measured. On the lateral view (right), the foraminal width (FW), pedicle width (PW), posterior pedicle margin (PPM), sagittal vertebral body height (SBH) and width (SBW) were measured. The PW was measured from the posterior border of the vertebral body to the line connecting the cranial and caudal facet joints. The vertebral body height and width measurements were taken at the midpoint of the vertebral body in both AP and lateral radiographs from the superior endplate to the inferior endplate.