Results: Pelvic radiographs of 340 patients (110 with axSpA including 61 patient with radiographic and 49 with non-radiographic axSpA, and 230 without SpA) were available for the CNN evaluation. The deep CNN achieved a sensitivity of 79% for the diagnosis of radiographic axSpA. The specificity of radiographic sacroiliitis detection was 94% (Table 1). The area under the receiver operating characteristics curve for the prediction of the presence of definite radiographic sacroiliitis was 88%. Figure 1 shows an exemplary class activation map of our CNN.

Table 1. Convolutional neural network predictions of the presence of radiographic sacroiliitis in patients with suspected axSpA according to the final diagnosis by rheumatologist in OptiRef (N=340).

Clinical diagnosis	CNN's prediction on the presence of definite radiographic sacroiliitis	
	Present	Not present
Radiographic axial SpA	48/61 (78.7%)	13/61 (21.3%)
Non-radiographic axial SpA	4/49 (8.2%)	45/49 (91.8%)
No SpA (other diagnosis)	14/230 (6.1%)	216/230 (93.9%)

Conclusion: The artificial neural network showed good generalizability and a high specificity with acceptable sensitivity in the detection of radiographic sacroiliitis when applied in the diagnostic setting of patients with chronic back pain and suspicion of axSpA. This algorithm can therefore be used to aid the detection of radiographic sacroiliitis as a part of the diagnostic approach.

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Figure 1. Inference of the proposed CNN on a randomly chosen pelvic radiograph from the OptiRef study.

This exemplary class activation map shows that our CNN almost exclusively and correctly focusses on the sacroiliac joints to predict whether definite radiographic sacroiliitis is present or not.

Disclosure of Interests: None declared

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OP0255 THE ROLE OF PELVIC MORPHOLOGY IN AXIAL SPONDYLOARTHRITIS

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Background: Axial Spondyloarthritis (axSpA) is a chronic inflammatory disease affecting the axial skeleton. It includes non-radiographic axSpA and radiographic axSpA [Ankylosing Spondylitis (AS)]. Male axSpA patients often have greater damage, while women report a higher disease burden. The role of pelvic morphology in the axSpA phenotype has not been explored. There is anatomic sexual dimorphism between the male and female pelvis. Given the phenotypic gender differences in axSpA, the role of pelvic morphometry is of interest.

Objectives: The purpose of this study is to determine whether an association exists between pelvic dimensions and radiographic damage in patients with axSpA, as well as to compare these measurements in axSpA patients and healthy controls.

Methods: This was a cross-sectional analysis comparing axSpA cases from a prospective cohort and non-axSpA controls from the UCSF radiology database. Informed consent was obtained from axSpA cohort patients and this study was approved by the institutional IRB. To be included in the analysis, we limited inclusion to age ≤ 50 with an Anterior Posterior (AP) pelvis radiograph in the system. We excluded non-nulliparity, pelvic fracture history, BMI ≥ 30 kg/m², any prosthetic history and avascular necrosis. We measured the pelvic inlet, pelvic outlet, and subpubic angle (based on validated scoring methods) (Figure 1) and assessed its relation to sacroiliac joint (SIJ) damage (average SIJ score, New York criteria) and modified Stoke Ankylosing Spondylitis Spine Score (mSASSS) in cases. AxSpA patients were also compared to age/gender matched controls. Pelvic measurements were performed by 2 blinded independent-trained readers in randomized, blinded image order. Inter-rater reliability was assessed. When examining the relationship between pelvic measurements and damage, linear regression was used to stratify by gender and adjust for potential confounders.

Results: The axSpA cohort included 481 patients, of which 210 men and 89 women were included in this analysis and gender/age matched controls. Rater inter-class correlation was above 0.70 for pelvic outlet and above 0.80 for other measures. Cases and controls were similar (Table 1). The regression analysis showed a significant relationship between the sub-pubic angle and damage in the spine (coeff=-0.342, p=0.003) in men with axSpA. A sensitivity analysis, excluding mSASSS outliers (mSASSS ≥ 16) upheld the relationship (coeff=-1.40, p=0.002).

Conclusion: In men with axSpA, there appears to be a relationship between sub-pubic angle and spinal radiographic damage. This is consistent with our finding that women have larger sub-pubic angles and lower spinal radiographic damage than men. A greater sub-pubic angle may protect against spinal involvement or associate with other protective factors. Further work should be performed to understand the contribution of pelvic anatomy to damage in axSpA.

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OP0256 CHOOSE WISELY: IMAGING FOR DIAGNOSIS OF AXIAL SPONDYLOARTHRITIS

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Background: To date, the European Alliance of Associations for Rheumatology (EULAR) guidelines recommend X-ray (XR) as first line imaging in axial Spondyloarthritis (axSpA) and magnetic resonance imaging (MR) if the diagnosis cannot be established by XR and clinical features. However, much knowledge has been gained recently strengthening the applicability of MR for the detection of structural lesions and raising the question, whether XR is still necessary. Also, several publications used low-dose computed tomography (CT) as reference standard and imaging test.

Objectives: In light of this complex diagnostic situation, the aim of this study was to compare the three major modalities, XR, MR and CT of SIJ, in their diagnostic performance of axSpA and differential diagnosis in a cohort of patients with low back pain using the final judgment of the rheumatologist as standard of reference.

Methods: 163 patients (89 with axSpA; 74 with degenerative diseases) underwent XR, CT and MR. Three blinded experts categorized the imaging into axSpA, other diseases or normal in 5 separate reading rounds (XR, CT, MR, XR+MR, CT+MR, respectively). The results were compared to the clinical diagnosis. Sensitivity and specificity values for axSpA and interrater reliability were compared.

Results: XR showed lower sensitivity and specificity (66.3%/67.6% respectively) compared to MR (82.0%/86.5%) and CT (77.5%/97.3%). Sensitivity and specificity of XR+MR was similar to MR alone (77.5% / 87.8%). However, CT+MR was