

SUPPLEMENTARY MATERIAL

METHODS

Data collection

1) Clinical: demographic characteristics, anthropometric measures, disease (both psoriasis and PsA) related characteristics were including treatment, family history of spondyloarthritis (SpA) according to ASAS, back pain (including inflammatory back pain [IBP] that was assessed through investigators' global evaluation based on their clinical judgment and established IBP features [e.g., improvement with exercise, no improvement with rest, night pain]) characteristics, extra-musculoskeletal manifestations (EMMs) other than psoriasis (such as uveitis and inflammatory bowel disease [IBD]), and physical examination (including musculoskeletal and skin). Musculoskeletal examinations included peripheral arthritis (tender joint count [TJC68], swollen joint count [SJC66]), enthesitis with an assessment of the Spondyloarthritis Research Consortium of Canada (SPARCC) score, the Maastricht Enthesitis Score (MASES), and the Leeds Enthesitis Index (LEI), and dactylitis. The skin examination included presence of psoriatic lesions with an assessment of Psoriasis Area and Severity Index (PASI) and nail involvement. We used the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), the Axial Spondyloarthritis Disease Activity Score (ASDAS), and the Disease Activity in Psoriatic Arthritis (DAPSA) to evaluate disease activity along with patient and physician global assessments of disease activity.

Central imaging assessment

This review occurred concurrently with the local investigators' assessments and, similarly, included radiographs and MRI scans of the SIJ and spine. The reviewers assessed images without access to the clinical information, ensuring a blinded assessment, and provided a narrative report, including potential differential diagnoses when applicable. For each imaging modality, the central reviewers answered four global questions and assigned LoC on a scale from -5 (definitely not) to +5 (definitely yes), similarly described above. The adjudication was required based on the presence or absence of definite radiographic sacroiliitis according to the modified New York (mNY) criteria for SIJ, and in case of disagreement in the global assessment of the spinal radiographs. Regarding MRIs, adjudication was conducted in cases of disagreement and/or a difference of ≥ 3 in LoC ratings regarding the global question on the presence of changes indicative of axial involvement.

1. Pelvic X-Ray grading

The sacroiliac radiographs were assessed based on the mNY criteria.

2. Spine X-Ray scoring

- **The global assessment for the spinal radiographs.**
- **The detailed assessment for each corner for the following features:**
 - Erosion
 - Squaring
 - Sclerosis
 - Syndesmophyte
 - Endplate Syndesmophyte
 - Non-Marginal Syndesmophyte
 - Ossification
 - Paravertebral Ossification
 - Ankylosis
 - Paravertebral ankylosis
 - Endplate Ankylosis
 - Facet fusion

3. Pelvic MRI scoring

- **The global assessment for the following questions:**
 - **Global Question:**
 - Are the findings on the MRI of the SI joints indicative of axial involvement in PsA?
 - **Inflammation Questions:**
 - Are there typical acute/active inflammatory lesions indicative of axial involvement in PsA present in the SI joints?
 - If yes, does this MRI fulfill the ASAS definition of a positive MRI of the SI joints (i.e. presence of bone marrow edema or osteitis adjacent to the SI joint and suggestive of sacroiliitis?)
 - Are there *any* active inflammatory changes (even if not typical for axial involvement in PsA) present in the SI joints? (Bone marrow oedema, Inflammation at the site of erosion cavity, Enthesitis, and Capsulitis)
 - **Structural Lesion Questions:**
 - Are there typical structural lesions indicative of axial involvement in PsA present in the SI joints?
 - Identification of which structural lesions are present (Sclerosis, Erosion, Fat Lesions, Bone bud, Fat metaplasia in an erosion cavity, and Ankylosis)
- **Detailed scoring for the SIJ MRI per quadrant included**

4. Spine MRI

The global assessment for the following questions (inflammation and structural):

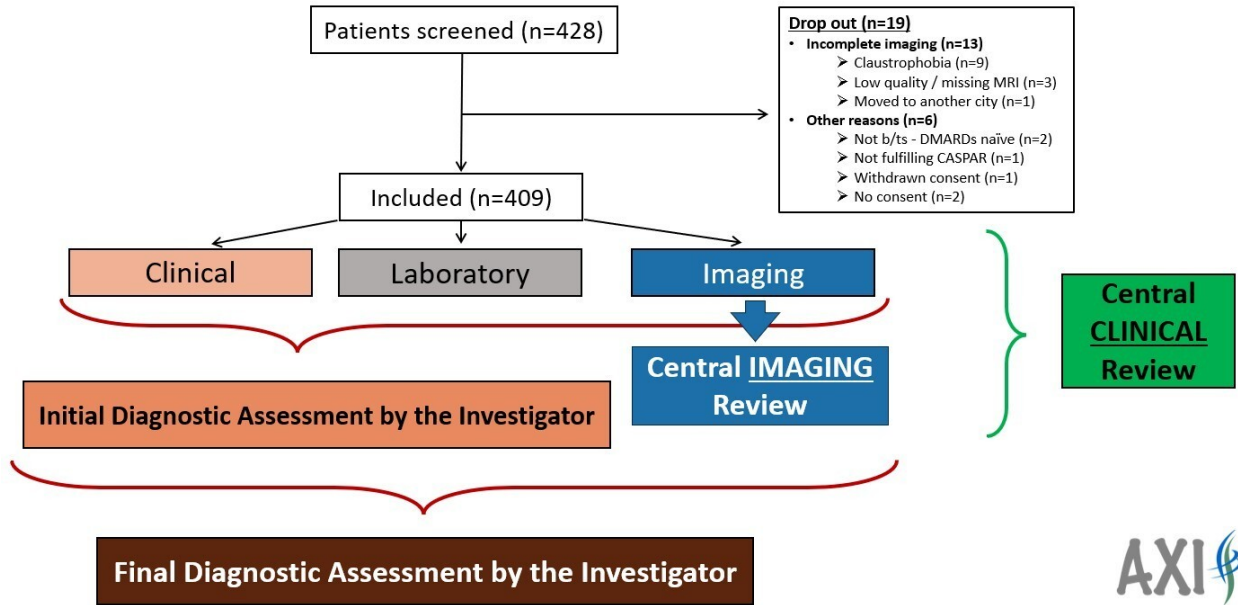
- **Global Question:**
 - Are the findings on the MRI of the spine indicative of axial involvement in PsA?
- **Inflammation Questions:**
 - Are there typical acute/active inflammatory lesions indicative of axial involvement in PsA present in the spine?
- **Structural Lesion Questions:**
 - Are there typical structural lesions indicative of axial involvement in PsA present in the spine?
 - o Identification of which structural lesions are present:
Fat Lesion, erosion, and new bone formation (spurs, ankylosis, syndesmophyte)

➤ Detailed scoring for the SIJ MRI per vertebral unit included

Statistical analysis

Continuous variables were reported as means with standard deviations (SD), and categorical variables were expressed as absolute numbers and relative frequencies. Comparisons between the two categories (axial involvement vs. no axial involvement) were made across the above-mentioned three diagnostic assessments. Categorical variables were analyzed using either a chi-square or Fisher's exact test, and continuous variables were compared using Mann-Whitney U or t-test. Statistical significance was set at a p-value of <0.05. All statistical analyses were conducted using R Software version 4.3.3 with *gtsummary* package.

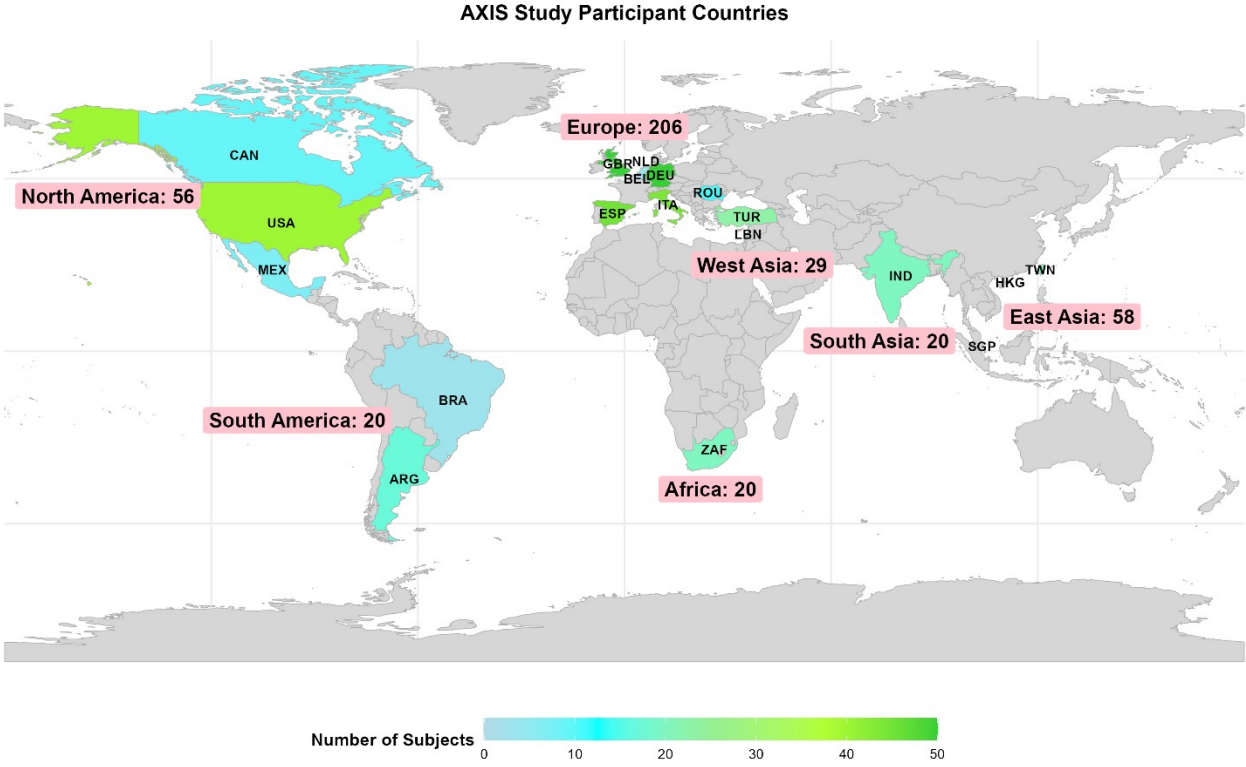
Supplementary Figure 1. Patient enrollment and study workflow in the AXIS Study.



The central clinical reviewers undertook a comprehensive review of all available clinical, laboratory, and imaging data, including the assessments and reports provided by the central imaging reviewers. The local investigator's diagnosis was not provided to ensure that the central clinical reviewers remained blind to this information during their review.



Supplementary Figure 2. Geographic representation of subjects enrolled in the AXIS Study.



Supplementary Table 1. Local investigator imaging assessment

Variable	Overall	Local investigator Initial Assessment of Axial Involvement		p-value	Local investigator Final Assessment of Axial Involvement		p-value	Central Clinical Review Consensus Categories of Axial Involvement		p-value
	N = 409	Yes-Initial N = 153	No-Initial N = 256		Yes-Final N = 112	No-Final N = 297		Yes-Central N = 69	No-Central N = 340	
Radiographic assessments of SIJ and Spine				<0.001			<0.001			<0.001
<i>SIJ mNY (+) & Spine (+)</i>	39 (9.5)	37 (24.2)	2 (0.8)		35 (31.3)	4 (1.3)		22 (31.9)	17 (5.0)	
<i>SIJ mNY (+) & Spine (-)</i>	18 (4.4)	16 (10.5)	2 (0.8)		14 (12.5)	4 (1.3)		11 (15.9)	7 (2.1)	
<i>SIJ mNY (-) & Spine (+)</i>	44 (10.8)	34 (22.2)	10 (3.9)		21 (18.8)	23 (7.7)		9 (13.0)	35 (10.3)	
<i>SIJ mNY (-) & Spine (-)</i>	308 (75.3)	66 (43.1)	242 (94.5)		42 (37.5)	266 (89.6)		27 (39.1)	281 (82.6)	
Global MRI assessments of SIJ and Spine				<0.001			<0.001			<0.001
<i>SIJ-MRI (+) & Spine-MRI (+)</i>	49 (12.0)	48 (31.4)	1 (0.4)		37 (33.0)	12 (4.0)		29 (42.0)	20 (5.9)	
<i>SIJ-MRI (+) & Spine-MRI (-)</i>	68 (16.6)	59 (38.6)	9 (3.5)		42 (37.5)	26 (8.8)		26 (37.7)	42 (12.4)	
<i>SIJ-MRI (-) & Spine-MRI (+)</i>	37 (9.0)	33 (21.6)	4 (1.6)		18 (16.1)	19 (6.4)		3 (4.3)	34 (10.0)	
<i>SIJ-MRI (-) & Spine-MRI (-)</i>	255 (62.3)	13 (8.5)	242 (94.5)		15 (13.4)	240 (80.8)		11 (15.9)	244 (71.8)	

The variables are presented as number (%)

MRI: Magnetic Resonance Imaging, SIJ: Sacroiliac Joint

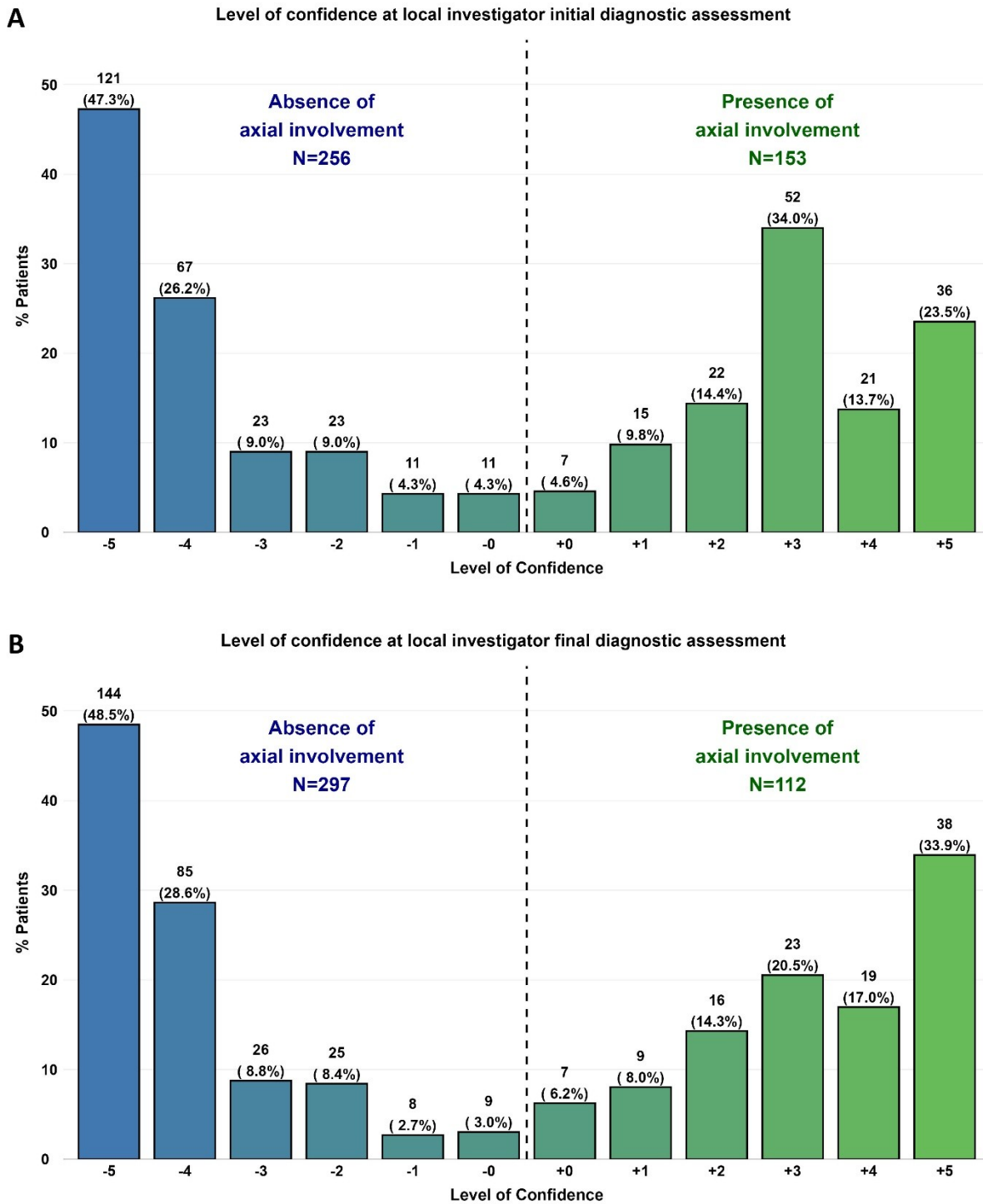
Supplementary Table 2. Central imaging reader consensus imaging assessment

Variable	Overall	Local investigator Initial Assessment of Axial Involvement		p-value	Local investigator Final Assessment of Axial Involvement		p-value	Central Clinical Review Consensus Categories of Axial Involvement		p-value
	N = 409	Yes-Initial N = 153	No-Initial N = 256		Yes-Final N = 112	No-Final N = 297		Yes-Central N = 69	No-Central N = 340	
Radiographic assessments of SIJ and Spine				<0.001			<0.001			<0.001
<i>SIJ mNY (+) & Spine (+)</i>	12 (2.9)	12 (7.8)	0 (0.0)		11 (9.8)	1 (0.3)		10 (14.5)	2 (0.6)	
<i>SIJ mNY (+) & Spine (-)</i>	15 (3.7)	14 (9.2)	1 (0.4)		15 (13.4)	0 (0.0)		14 (20.3)	1 (0.3)	
<i>SIJ mNY (-) & Spine (+)</i>	23 (5.6)	6 (3.9)	17 (6.6)		7 (6.3)	16 (5.4)		8 (11.6)	15 (4.4)	
<i>SIJ mNY (-) & Spine (-)</i>	359 (87.8)	121 (79.1)	238 (93.0)		79 (70.5)	280 (94.3)		37 (53.6)	322 (94.7)	
Global MRI assessments of SIJ and Spine				<0.001			<0.001			<0.001
<i>SIJ-MRI (+) & Spine-MRI (+)</i>	33 (8.1)	30 (19.6)	3 (1.2)		32 (28.6)	1 (0.3)		33 (47.8)	0 (0.0)	
<i>SIJ-MRI (+) & Spine-MRI (-)</i>	29 (7.1)	23 (15.0)	6 (2.3)		23 (20.5)	6 (2.0)		23 (33.3)	6 (1.8)	
<i>SIJ-MRI (-) & Spine-MRI (+)</i>	16 (3.9)	8 (5.2)	8 (3.1)		8 (7.1)	8 (2.7)		7 (10.1)	9 (2.6)	
<i>SIJ-MRI (-) & Spine-MRI (-)</i>	331 (80.9)	92 (60.1)	239 (93.4)		49 (43.8)	282 (94.9)		6 (8.7)	325 (95.6)	

The variables are presented as number (%)

MRI: Magnetic Resonance Imaging, SIJ: Sacroiliac Joint

Supplementary Figure 3. Level of confidence for local investigator's diagnostic assessment: A) at initial assessment, and B) at final assessment.



The level of confidence (LoC) in this determination was recorded on a scale ranging from -5 (definitely not) to +5 (definitely yes)