



Correction

Correction to: Performance of clinical, laboratory and imaging features for diagnosing spondyloarthritis—a systematic literature review and meta-analysis

This is a correction to: Ana Bento da Silva, Maria Helena Lourenço, Sofia Ramiro, Louise Falzon, Jaime Cunha-Branco, Désirée van der Heijde, Robert Landewé, Alexandre Sepriano, Performance of clinical, laboratory and imaging features for diagnosing spondyloarthritis—a systematic literature review and meta-analysis, *Rheumatology*, 2024; <https://doi.org/10.1093/rheumatology/keae065>

In the originally published version of the manuscript, the measures of diagnostic performance of the feature “age at symptom onset <45 years” were incorrect, as four studies were inappropriately included in this analysis. This feature

can only be assessed in one study (Xiang 2022 CR). The appropriate corrections were made in [Table 2](#), [Table 4](#), online [Supplementary Table S5](#) and online [Supplementary Table S6](#).

[Table 2](#) was emended in the last line of data, “Age at symptom onset <45 years^h”, figures changed to read: “1 (1) 1418 46 63 78 2.8 0.5”. Note a was emended to read: “Bivariate analysis for all features (except age at symptom onset <45 years);[...]” instead of: “Bivariate analysis for all features; [...]”; “h” was added to the list of notes: “h Only one study available: sensitivity, specificity, LR⁺ and LR⁻ were calculated manually.”

Table 2 should read:

Table 2. Performance of each SpA feature for the diagnosis of axSpA (meta-analysis)

SpA Feature ^a	Number of Studies (cohorts)	Sample size N (min; max)	SpA Patients N (min; max)	Sensitivity % (95% CI)	Specificity % (95% CI)	LR ⁺ (95% CI)	LR ⁻ (95% CI)
IBP (any definition) ^b	18 (19)	9157 (49; 1418)	3742 (19; 516)	83 (74; 89)	52 (36; 68)	1.7 (1.3; 2.3)	0.3 (0.2; 0.5)
Buttock pain ^c	10 (10)	4222 (49; 1210)	2043 (19; 516)	56 (40; 71)	69 (55; 80)	1.8 (1.3; 2.4)	0.6 (0.5; 0.8)
Heel enthesitis	7 (7)	5164 (298; 1418)	1776 (46; 425)	22 (16; 30)	88 (78; 94)	1.9 (1.0; 3.6)	0.9 (0.8; 1.0)
Peripheral arthritis	14 (14)	7908 (49; 1418)	3229 (19; 516)	22 (15; 32)	92 (83; 96)	2.6 (1.3; 5.3)	0.9 (0.8; 0.9)
Dactylitis	11 (11)	7362 (200; 1418)	3022 (46; 516)	5 (3; 8)	99 (97; 100)	4.3 (1.8; 10.2)	1.0 (0.9; 1.0)
AAU	13 (13)	7969 (200; 1418)	3304 (46; 516)	9 (7; 12)	98 (97; 99)	5.0 (2.9; 8.7)	0.9 (0.9; 1.0)
Psoriasis	14 (14)	8018 (49; 1418)	3323 (19; 516)	9 (6; 13)	95 (93; 96)	1.6 (1.2; 2.3)	1.0 (0.9; 1.0)
IBD	13 (13)	7969 (200; 1418)	3304 (46; 516)	4 (3; 6)	99 (98; 100)	4.2 (2.0; 8.9)	1.0 (1.0; 1.0)
Any EMM	2 (2)	646 (133; 513)	268 (47; 221)	29 (21; 38)	87 (81; 91)	2.2 (1.5; 3.4)	0.8 (0.7; 1.0)
Family history (any definition) ^d	16 (16)	8734 (49; 1418)	3816 (19; 516)	20 (16; 26)	91 (85; 94)	2.2 (1.3; 3.5)	0.9 (0.8; 0.9)
Family history (ASAS)	5 (5)	2395 (175; 697)	1208 (75; 391)	30 (21; 40)	77 (72; 80)	1.3 (1.1; 1.5)	0.9 (0.8; 1.0)
Good response to NSAIDs	13 (13)	7818 (49; 1418)	3174 (19; 516)	75 (58; 87)	61 (50; 72)	2.0 (1.4; 2.7)	0.4 (0.2; 0.7)
Elevated CRP	7 (7)	3442 (49; 1210)	1448 (19; 425)	37 (35; 40)	90 (84; 95)	3.9 (2.2; 6.7)	0.7 (0.6; 0.7)
Elevated CRP/ESR	4 (4)	2730 (513; 867)	1709 (317; 516)	32 (19; 49)	90 (81; 95)	3.2 (1.7; 5.9)	0.8 (0.6; 0.9)
HLA-B27	23 (25)	10092 (49; 1210)	5016 (19; 516)	66 (59; 73)	78 (70; 85)	3.1 (2.2; 4.2)	0.4 (0.4; 0.5)
BME on MRI-SIJ (ASAS) ^e	12 (12)	5298 (84; 1210)	2708 (25; 455)	53 (38; 68)	95 (88; 98)	10.9 (4.9; 24.3)	0.5 (0.4; 0.7)
Structural damage on MRI-SIJ (global assessment) ^f	3 (3)	722 (178; 361)	336 (95; 135)	59 (34; 80)	90 (86; 93)	6.1 (3.7; 10.0)	0.5 (0.2; 0.8)
Definite damage on X-SIJ (mNY) ^g	11 (11)	4799 (116; 1210)	2344 (47; 505)	37 (28; 48)	98 (95; 99)	20.6 (7.9; 53.6)	0.6 (0.5; 0.7)
Any enthesitis	9 (9)	4313 (49; 1210)	1996 (19; 516)	21 (14; 30)	93 (87; 96)	2.8 (1.6; 4.7)	0.9 (0.8; 0.9)
Preceding infection	3 (4)	2717 (157; 1210)	1427 (65; 516)	3 (2; 4)	99 (98; 99)	3.0 (1.8; 5.1)	1.0 (1.0; 1.0)
Age at symptom onset <45 years ^h	1 (1)	1418	46	63	78	2.8	0.5

^a Bivariate analysis for all features (except age at symptom onset <45 years); elevated ESR alone not evaluated in any study.

^b ASAS definition in 11 studies, other definitions in 5 studies (not specified in 2 studies).

^c Alternating buttock pain in 8 studies; unilateral or bilateral alternating buttock pain in 2 studies.

^d ASAS definition in 5 studies; other definitions in 11 studies.

^e Local reading in 4 studies; central reading in 6 studies; not specified in 2 studies.

^f Central reading (agreement ≥4/7 readers) in 2 studies; not specified in 1 study.

^g Only one study available; sensitivity, specificity, LR⁺ and LR⁻ were calculated manually.

^h Local reading in 8 studies; central reading in 2 studies; not specified in 1 study.

AAU: acute anterior uveitis; ASAS: Assessment of Spondyloarthritis International Society; axSpA: axial spondylarthritis; BME: bone marrow edema; CI: confidence interval; CRP: C-reactive protein; EMM: extra musculoskeletal manifestations; ESR: erythrocyte sedimentation rate; IBD: inflammatory bowel disease; IBP: inflammatory back pain; LR⁺: positive likelihood ratio; LR⁻: negative likelihood ratio; Max.: maximum; Min.: minimum; mNY: modified New York criteria; MRI-SIJ: magnetic resonance imaging of sacroiliac joints; NSAIDs: nonsteroidal anti-inflammatory drugs; SpA: spondylarthritis; X-SIJ: radiography of sacroiliac joints.

instead of:

Table 2. Performance of each SpA feature for the diagnosis of axSpA (meta-analysis)

SpA feature ^a	Studies, <i>n</i> (cohorts)	Sample size, <i>n</i> (minimum–maximum)	SpA patients, <i>n</i> (minimum–maximum)	Sensitivity, % (95% CI)	Specificity, % (95% CI)	LR ⁺ , % (95% CI)	LR ⁻ , % (95% CI)
IBP (any definition) ^b	18 (19)	9157 (49–1418)	3742 (19–516)	83 (74, 89)	52 (36, 68)	1.7 (1.3, 2.3)	0.3 (0.2, 0.5)
Buttock pain ^c	10 (10)	4222 (49–1210)	2043 (19–516)	56 (40, 71)	69 (55, 80)	1.8 (1.3, 2.4)	0.6 (0.5, 0.8)
Heel enthesitis	7 (7)	5164 (298–1418)	1776 (46–425)	22 (16, 30)	88 (78, 94)	1.9 (1.0, 3.6)	0.9 (0.8, 1.0)
Peripheral arthritis	14 (14)	7908 (49–1418)	3229 (19–516)	22 (15, 32)	92 (83, 96)	2.6 (1.3, 5.3)	0.9 (0.8, 0.9)
Dactylitis	11 (11)	7362 (200–1418)	3022 (46–516)	5 (3, 8)	99 (97, 100)	4.3 (1.8, 10.2)	1.0 (0.9, 1.0)
AAU	13 (13)	7969 (200–1418)	3304 (46–516)	9 (7, 12)	98 (97, 99)	5.0 (2.9, 8.7)	0.9 (0.9, 1.0)
Psoriasis	14 (14)	8018 (49–1418)	3323 (19–516)	9 (6, 13)	95 (93, 96)	1.6 (1.2, 2.3)	1.0 (0.9, 1.0)
IBD	13 (13)	7969 (200–1418)	3304 (46–516)	4 (3, 6)	99 (98, 100)	4.2 (2.0, 8.9)	1.0 (1.0, 1.0)
Any EMM	2 (2)	646 (133–513)	268 (47–221)	29 (21, 38)	87 (81, 91)	2.2 (1.5, 3.4)	0.8 (0.7, 1.0)
Family history (any definition) ^d	16 (16)	8734 (49–1418)	3816 (19–516)	20 (16, 26)	91 (85, 94)	2.2 (1.3, 3.5)	0.9 (0.8, 0.9)
Family history (ASAS)	5 (5)	2395 (175–697)	1208 (75–391)	30 (21, 40)	77 (72, 80)	1.3 (1.1, 1.5)	0.9 (0.8, 1.0)
Good response to NSAIDs	13 (13)	7818 (49–1418)	3174 (19–516)	75 (58, 87)	61 (50, 72)	2.0 (1.4, 2.7)	0.4 (0.2, 0.7)
Elevated CRP	7 (7)	3442 (49–1210)	1448 (19–425)	37 (35, 40)	90 (84, 95)	3.9 (2.2, 6.7)	0.7 (0.6, 0.7)
Elevated CRP/ESR	4 (4)	2730 (513–867)	1709 (317–516)	32 (19, 49)	90 (81, 95)	3.2 (1.7, 5.9)	0.8 (0.6, 0.9)
HLA-B27	23 (25)	10092 (49–1210)	5016 (19–516)	66 (59, 73)	78 (70, 85)	3.1 (2.2, 4.2)	0.4 (0.4, 0.5)
BMO on MRI-SIJ (ASAS) ^e	12 (12)	5298 (84–1210)	2708 (25–455)	53 (38, 68)	95 (88, 98)	10.9 (4.9, 24.3)	0.5 (0.4, 0.7)
Structural damage on MRI-SIJ (global assessment) ^f	3 (3)	722 (178–361)	336 (95–135)	59 (34, 80)	90 (86, 93)	6.1 (3.7, 10.0)	0.5 (0.2, 0.8)
Definite damage on X-SIJ (mNY) ^g	11 (11)	4799 (116–1210)	2344 (47–505)	37 (28, 48)	98 (95, 99)	20.6 (7.9, 53.6)	0.6 (0.5, 0.7)
Any enthesitis	9 (9)	4313 (49–1210)	1996 (19–516)	21 (14, 30)	93 (87, 96)	2.8 (1.6, 4.7)	0.9 (0.8, 0.9)
Preceding infection	3 (4)	2717 (157–1210)	1427 (65–516)	3 (2, 4)	99 (98, 99)	3.0 (1.8, 5.1)	1.0 (1.0, 1.0)
Age at symptom onset <45 years	5 (5)	3860 (261–1418)	1082 (46–425)	84 (74, 91)	36 (17, 60)	1.3 (1.1, 1.6)	0.4 (0.3, 0.6)

^a Bivariate analysis for all features; elevated ESR alone not evaluated in any study.

^b ASAS definition in 11 studies, other definitions in 5 studies (not specified in 2 studies).

^c Alternating buttock pain in 8 studies, unilateral or bilateral alternating buttock pain in 2 studies.

^d ASAS definition in 5 studies, other definitions in 11 studies.

^e Local reading in 4 studies, central reading in 6 studies, not specified in 2 studies.

^f Central reading (agreement ≥4/7 readers) in 2 studies, not specified in 1 study.

^g Local reading in 8 studies, central reading in 2 studies, not specified in 1 study.

In **Table 4**, the last line of data was removed. Beneath the table, note **a** was emended to read: “Age at symptom onset <45 years not evaluated in any study.” instead of: “a Bivariate analysis.” Alpha-references for the remaining notes were reset from “b Bivariate analysis” onwards.

Table 4 should read:

Table 4. Performance of each SpA feature for the diagnosis of SpA as a whole (meta-analysis)

SpA Feature ^a	Number of Studies (cohorts)	Sample size N (min; max)	SpA Patients N (min; max)	Sensitivity %	Specificity %	LR ⁺	LR ⁻
IBP (any definition) ^{b,e}	4 (4)	1572 (99; 720)	1091 (51; 538)	67 (60; 73)	57 (45; 69)	1.6 (1.2; 2.0)	0.6 (0.5; 0.7)
Buttock pain ^{c,f}	3 (3)	3665 (99; 2846)	669 (51; 538)	30 (27; 34)	82 (68; 90)	1.7 (0.9; 3.0)	0.9 (0.7; 1.0)
Heel enthesitis ^b	4 (4)	5260 (99; 3877)	1077 (51; 538)	40 (28; 53)	80 (69; 88)	2.0 (1.3; 3.1)	0.8 (0.7; 0.9)
Peripheral arthritis ^b	5 (5)	5449 (99; 3877)	1183 (51; 538)	43 (27; 61)	76 (53; 90)	1.8 (0.9; 3.4)	0.8 (0.7; 0.8)
Dactylitis ^c	4 (4)	5260 (99; 3877)	1077 (51; 538)	12 (7; 20)	98 (86; 100)	5.0 (0.8; 32.1)	0.9 (0.8; 1.0)
AAU ^c	4 (4)	5198 (37; 3877)	1052 (26; 538)	12 (4; 29)	96 (82; 99)	2.8 (0.6; 13.5)	0.9 (0.8; 1.1)
Psoriasis ^b	5 (5)	5449 (99; 3877)	1183 (51; 538)	15 (10; 23)	96 (92; 98)	3.9 (1.8; 8.2)	0.9 (0.8; 0.9)
IBD ^b	5 (5)	5449 (99; 3877)	1183 (51; 538)	5 (4; 6)	98 (98; 99)	2.8 (2.3; 3.5)	1.0 (1.0; 1.0)
Family history (any definition) ^{b,g}	3 (3)	4696 (99; 3877)	681 (51; 538)	31 (27; 34)	82 (81; 83)	1.7 (1.6; 1.8)	0.8 (0.8; 0.9)
Good response to NSAIDs ^b	3 (3)	3665 (99; 2846)	669 (51; 538)	60 (47; 71)	62 (54; 69)	1.6 (1.4; 1.8)	0.7 (0.5; 0.8)
Elevated CRP ^b	2 (2)	1284 (564; 720)	934 (396; 538)	35 (20; 54)	86 (73; 93)	2.5 (1.4; 4.5)	0.8 (0.6; 0.9)
Elevated ESR ^d	1 (1)	720	538	21	92	2.7	0.9
HLA-B27 ^c	4 (4)	1554 (98; 720)	1084 (51; 538)	70 (48; 86)	71 (50; 86)	2.4 (1.6; 3.7)	0.4 (0.3; 0.6)
BME on MRI-SIJ (ASAS) ^{c,h}	2 (2)	905 (185; 720)	640 (102; 538)	39 (19; 63)	97 (95; 99)	14.7 (7.0; 31.0)	0.6 (0.4; 0.9)
Structural damage on MRI-SIJ (global definition) ^{d,i}	1 (1)	185	102	77	93	10.7	0.2
Definite damage on X-SIJ (mNYS) ^{d,j}	1 (1)	720	538	19	100	n/a	0.8
Any enthesitis ^c	2 (2)	819 (99; 720)	589 (51; 538)	20 (4; 61)	90 (46; 99)	2.0 (0.2; 16.2)	0.9 (0.6; 1.4)
Preceding infection ^d	1 (1)	720	538	4	100	n/a	1.0

^a Age at symptom onset <45 years not evaluated in any study.

^b Bivariate analysis.

^c Univariate analysis.

^d Only one study available; sensitivity, specificity, LR⁺ and LR⁻ were calculated manually.

^e ASAS definition in 1 study; other definitions in 2 studies, not reported in 1 study.

^f Alternating buttock pain in 1 study; not specified in 2 studies.

^g ASAS definition in 1 study; other definitions in 2 studies.

^h Central reading in 1 study; not specified in 1 study.

ⁱ Central reading. Presence of each type of structural lesions on MRI-SIJ (erosions, sclerosis, fatty metaplasia, backfill and ankylosis) not evaluated in any study.

^j No information about type of reading was available.

AAU: acute anterior uveitis; ASAS: Assessment of Spondyloarthritis International Society; axSpA: axial spondylarthritis; BME: bone marrow edema; CRP: C-reactive protein; ESR: erythrocyte sedimentation rate;

IBD: inflammatory bowel disease; IBP: inflammatory back pain; LR⁺: positive likelihood ratio; LR⁻: negative likelihood ratio; Max.: maximum; Min.: minimum; mNY: modified New York criteria; MRI-SIJ:

magnetic resonance imaging of sacroiliac joints; NSAIDs: nonsteroidal anti-inflammatory drugs; SpA: spondylarthritis; X-SIJ: radiography of sacroiliac joints.

instead of:

Table 4. Performance of each SpA feature for the diagnosis of SpA as a whole (meta-analysis)

SpA feature	Studies, <i>n</i> (cohorts)	Sample size, <i>n</i> (minimum–maximum)	SpA patients, <i>n</i> (minimum– maximum)	Sensitivity, % (95% CI)	Specificity, % (95% CI)	LR ⁺ , % (95% CI)	LR ⁻ , % (95% CI)
IBP (any definition) ^{a,d}	4 (4)	1572 (99–720)	1091 (51–538)	67 (60, 73)	57 (45, 69)	1.6 (1.2, 2.0)	0.6 (0.5, 0.7)
Buttock pain ^{b,e}	3 (3)	3665 (99–2846)	669 (51–538)	30 (27, 34)	82 (68, 90)	1.7 (0.9, 3.0)	0.9 (0.7, 1.0)
Heel enthesitis ^a	4 (4)	5260 (99–3877)	1077 (51–538)	40 (28, 53)	80 (69, 88)	2.0 (1.3, 3.1)	0.8 (0.7, 0.9)
Peripheral arthritis ^a	5 (5)	5449 (99–3877)	1183 (51–538)	43 (27, 61)	76 (53, 90)	1.8 (0.9, 3.4)	0.8 (0.7, 0.8)
Dactylitis ^b	4 (4)	5260 (99–3877)	1077 (51–538)	12 (7, 20)	98 (86, 100)	5.0 (0.8, 32.1)	0.9 (0.8, 1.0)
AAU ^b	4 (4)	5198 (37–3877)	1052 (26–538)	12 (4, 29)	96 (82, 99)	2.8 (0.6, 13.5)	0.9 (0.8, 1.1)
Psoriasis ^a	5 (5)	5449 (99–3877)	1183 (51–538)	15 (10, 23)	96 (92, 98)	3.9 (1.8, 8.2)	0.9 (0.8, 0.9)
IBD ^a	5 (5)	5449 (99–3877)	1183 (51–538)	5 (4, 6)	98 (98, 99)	2.8 (2.3, 3.5)	1.0 (1.0, 1.0)
Family history (any definition) ^{a,f}	3 (3)	4696 (99–3877)	681 (51–538)	31 (27, 34)	82 (81, 83)	1.7 (1.6, 1.8)	0.8 (0.8, 0.9)
Good response to NSAIDs ^a	3 (3)	3665 (99–2846)	669 (51–538)	60 (47, 71)	62 (54, 69)	1.6 (1.4, 1.8)	0.7 (0.5, 0.8)
Elevated CRP ^a	2 (2)	1284 (564–720)	934 (396–538)	35 (20, 54)	86 (73, 93)	2.5 (1.4, 4.5)	0.8 (0.6, 0.9)
Elevated ESR ^c	1 (1)	720	538	21	92	2.7	0.9
HLA-B27 ^b	4 (4)	1554 (98–720)	1084 (51–538)	70 (48, 86)	71 (50, 86)	2.4 (1.6, 3.7)	0.4 (0.3, 0.6)
BMO on MRI-SIJ (ASAS) ^{b,g}	2 (2)	905 (185–720)	640 (102–538)	39 (19, 63)	97 (95, 99)	14.7 (7.0, 31.0)	0.6 (0.4, 0.9)
Structural damage on MRI-SIJ (global definition) ^{c,h}	1 (1)	185	102	77	93	10.7	0.2
Definite damage on X-SIJ (mNY) ^{c,i}	1 (1)	720	538	19	100	n/a	0.8
Any enthesitis ^b	2 (2)	819 (99–720)	589 (51–538)	20 (4, 61)	90 (46, 99)	2.0 (0.2, 16.2)	0.9 (0.6, 1.4)
Preceding infection ^c	1 (1)	720	538	4	100	n/a	1.0
Age at symptom onset <45 years ^a	2 (2)	3410 (564–2846)	476 (80–396)	68 (64, 72)	47 (45, 48)	1.3 (1.2, 1.4)	0.7 (0.6, 0.8)

^a Bivariate analysis.

^b Univariate analysis.

^c Only one study available: sensitivity, specificity, LR⁺ and LR⁻ were calculated manually.

^d ASAS definition in 1 study, other definitions in 2 studies, not reported in 1 study.

^e Alternating buttock pain in 1 study, not specified in 2 studies.

^f ASAS definition in 1 study, other definitions in 2 studies.

^g Central reading in 1 study, not specified in 1 study.

^h Central reading. Presence of each type of structural lesion on MRI-SIJ (erosions, sclerosis, fatty metaplasia, backfill and ankylosis) not evaluated in any study.

ⁱ No information about type of reading was available.

Under **Supplementary Table S5**, note a was emended to read: “a Analysis for structural lesions on MRI-SIJ and age at symptom onset <45 years not possible to perform (number of studies <4).” instead of: “a Analysis for structural lesions on MRI-SIJ not possible to perform (number of studies <4).”.

Under **Supplementary Table S6**, note a was emended to read: “a Heel enthesitis, any extra-musculoskeletal manifestation, elevated erythrocyte sedimentation rate, presence of backfill on MRI-SIJ and age at symptom onset <45 years not evaluated in any study.” instead of: “a Heel enthesitis, any extra-musculoskeletal manifestation, elevated erythrocyte sedimentation

rate and presence of backfill on MRI-SIJ not evaluated in any study.”

In section **Results**, under **Diagnostic performance of SpA features – Axial SpA**, second sentence should read: “IBP and good response to NSAIDs had the highest sensitivity (83% and 75%, respectively) and the lowest specificity (52% and 61%, respectively).” instead of: “IBP, good response to NSAIDs and age at symptom onset <45 years had the highest sensitivity (83%, 75% and 84%, respectively) and the lowest specificity (52%, 61% and 36%, respectively).”

The emendations have been made to the article.