

Table S1: Diagnostic accuracy of demographics for lumbar spinal stenosis (LSS)

Systematic review of diagnostic accuracy of patient history, clinical findings, and physical tests in the diagnosis of lumbar spinal stenosis (Cook, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Cook	2011	Tertiary	N= 1448	Consecutive patients with suspicion of a condition associated with origin at the lumbar spine	Expert opinion based on clinical findings and imaging (MRI)	Age > 48 years	Se 0.88 (0.85, 0.91); SP 0.49 (0.46, 0.52); +LR 1.70 (1.60, 1.80); -LR 0.25 (0.21, 0.32); +PTP % (95% CI): 53.46 (52, 56); +PTP absolute differences %: 13.33 (medium); - PTP % (95% CI): 14.45 (11, 17); - PTP absolute differences %: 25.88 (large)
Diagnosis of Lumbar Spinal Stenosis An Updated Systematic Review of the Accuracy of Diagnostic Tests (De Shepper, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Konno	2007	Primary and secondary	N=468	Consecutive patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs, and lower legs	Consensus diagnostic impression of expert physicians, confirmation by x-rays and MRI	Age < 60 years	Se 0.15 (0.11,0.20); Sp 0.62 (0.56,0.68); +LR 0.41; -LR 1.4
						Age > 70 years	Se 0.64 (0.58, 0.71); Sp 0.68 (0.62, 0.74); +LR 2.0; -LR 0.52
Katz	1995	Tertiary	N=75	Patients with low back pain with or without radiation to the lower extremities	Expert opinion (>80% confidence in diagnosis for cases and <20% for non-cases)	Age > 65 years	Se 0.77 (0.64,0.90); Sp 0.69 (0.53,0.85); +LR 2.5; -LR 0.33

Table S2: Diagnostic accuracy of patient history findings for LSS

Systematic review of diagnostic accuracy of patient history, clinical findings, and physical tests in the diagnosis of lumbar spinal stenosis (Cook, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Cook	2011	Tertiary	N= 1448	Consecutive patients with suspicion of a condition associated with origin at the lumbar spine	Expert opinion based on clinical findings and imaging (MRI)	Bilateral symptoms	Se 0.03 (0.02, 0.05); Sp 0.98 (0.97, 0.99); +LR 2.30 (1.10, 4.80); -LR 0.98 (0.97, 0.99); +PTP %(95% CI): 60.85 (35, 66); +PTP absolute differences %: 20.52 (medium); -PTP %(95% CI): 39.84 (40, 41); -PTP absolute differences %: 0.49 (small)
						Leg or back pain worse	Se 0.17 (0.14, 0.20); Sp 0.92 (0.90, 0.94); +LR 2.10 (1.50, 2.80); -LR 0.91 (0.87, 0.94); +PTP %(95% CI): 58.66 (50, 64); +PTP absolute differences %: 18.33 (medium); -PTP % (95% CI): 38.02 (37, 38); -PPT absolute differences %: 2.31 (small)
						Moderate back pain	"Se 0.95 (0.93, 0.97); Sp 0.02 (0.01, 0.03); +LR 0.97 (0.96, 0.99); -LR 2.10 (1.20, 3.90); PTP %(95% CI): 39.59 (39, 40); +PTP absolute differences %: 0.74 (small); -PTP % (95% CI): 63 (49, 75); -PPT absolute differences %: 22.67 (medium)"
						Moderate buttock pain	Se 0.81 (0.78, 0.84); Sp 0.33 (0.30, 0.36); +LR 1.20 (1.10, 1.30); -LR 0.60 (0.46–0.72); PTP %(95% CI): 44.78 (44, 47); +PTP absolute differences %: 4.45 (small); -PTP % (95% CI): 28.85 (24, 32); -PPT absolute differences %: 11.48 (small)
						Moderate leg pain	Se 0.90 (0.87, 0.92); Sp 0.24 (0.21, 0.27); +LR 1.20 (1.10, 1.20); -LR 0.43 (0.32, 0.58); PTP %(95% CI): 44.78 (43, 46); +PTP absolute differences %: 4.45 (small); -PTP % (95% CI): 22.51 (18, 27); -PPT absolute differences %: 18.72 (medium)
						Pain constancy	Se 0.23 (0.20, 0.27); Sp 0.78 (0.75, 0.81); +LR 1.10 (0.86, 1.30); -LR 0.98 (0.92, 1.04); PTP %(95% CI): 42.64 (37, 46) ; +PTP absolute differences %: 2.31 (small); -PTP % (95% CI): 39.84 (39, 41); -PPT absolute differences %: 0.49 (small)

						Pain with walking/ standing	Se 0.67 (0.64, 0.69); Sp 0.44 (0.42, 0.46); +LR 1.2; -LR 0.75
						Sitting relieves pain	Se 0.26 (0.24, 0.29); Sp 0.86 (0.84, 0.88); +LR 1.9, - LR 0.86
Sugiokia	2008	Primary and secondary	N=469	Patients showing primary symptoms of pain or numbness in the lower limbs, including the buttocks, thighs and lower legs	Physician-diagnosed LSS	Change position frequently to try and get lower extremities comfortable	Se 0.73 (0.66, 0.79); Sp 0.39 (0.32, 0.47); +LR 1.19 (1.03, 1.38); -LR 0.70 (0.52, 0.94); +PTP % 57.50 (54, 61); +PTP absolute differences %: 4.29 (small); -PTP % 44.32 (37, 51); -PPT absolute differences %: 8.89 (small)
						Improvement of symptoms when bending backward	Se 0.16 (0.11, 0.21); Sp 0.78 (0.71, 0.84); +LR 0.70 (0.45, 1.08); -LR 1.08 (0.98, 1.20); +PTP % 45 (34, 56); +PTP absolute differences %: 8.21 (small); -PTP % 55 (53, 58); -PPT absolute differences %: 1.79 (small)
						Have to hold onto something to get out of an easy chair due to lower extremities	Se 0.43 (0.36, 0.50); Sp 0.68 (0.61, 0.75); +LR 1.35 (1.03, 1.76); -LR 0.83 (0.71, 0.98); +PTP % 60.55 (54, 67); +PTP absolute differences %: 7.34 (small); -PTP % 48.55 (45, 53); -PPT absolute differences %: 4.66 (small)
						Numbness of lower legs while walking	Se 0.75 (0.68, 0.81); Sp 0.37 (0.29, 0.44); +LR 1.18 (1.03, 1.36); -LR 0.68 (0.50, 0.93); +PTP % 58.29 (54, 61); +PTP absolute differences %: 5.08 (small); -PTP % 43.60 (36, 51); -PPT absolute differences %: 9.61 (small)
						Only stand for short periods of time due to lower extremities	Se 0.71 (0.65, 0.78); Sp 0.43 (0.35, 0.51); +LR 1.25 (1.07, 1.46); -LR 0.67 (0.50, 0.88); +PTP % 58.70 (55, 62); +PTP absolute differences %: 5.49 (small); -PTP % 43.24 (37, 50); -PPT absolute differences %: 10 (small)
						Only walk for short distances due to lower extremities	Se 0.76 (0.69, 0.82); Sp 0.37 (0.29, 0.44); +LR 1.21 (1.05, 1.38); -LR 0.65 (0.47, 0.89); +PTP % 57.91 (54, 61); +PTP absolute differences %: 4.70 (small); -PTP % 57 (49, 65); -PPT absolute differences %: 3.79 (small)
						Use a handrail to get upstairs due to lower extremities	Se 0.66 (0.59, 0.73); Sp 0.66 (0.57, 0.75); +LR 1.27 (1.06, 1.50); -LR 0.71 (0.55, 0.91); +PTP % 59.08 (55, 63); +PTP absolute differences %: 5.87 (small);

							-PTP % 44.67 (38, 51); -PPT absolute differences %: 8.54 (small)
						Walking is easier when bending forward	Se 0.55 (0.48, 0.62); Sp 0.61 (0.53, 0.68); +LR 1.42 (1.14, 1.78); -LR 0.73 (0.60, 0.89); +PTP % 61.75 (56, 67); +PTP absolute differences %: 8.54 (small); -PTP % 45.36 (41, 50); -PPT absolute differences %: 7.85 (small)
						Walk more slowly than usual due to lower extremities	Se 0.86 (0.81, 0.91); Sp 0.27 (0.20, 0.34); +LR 1.17 (1.06, 1.30); -LR 0.52 (0.34, 0.79); +PTP % 57.09 (55, 60); +PTP absolute differences %: 3.88 (small); -PTP % 37.16 (28, 47); -PPT absolute differences %: 16.05 (medium)
						Change position frequently to try and get lower extremities comfortable	Se 0.73 (0.66, 0.79); Sp 0.39 (0.32, 0.47); +LR 1.19 (1.03, 1.38); -LR 0.70 (0.52, 0.94); +PTP % 57.50 (54, 61); +PTP absolute differences %: 4.29 (small); -PTP % 44.32 (37, 51); -PPT absolute differences %: 8.89 (small)
						Improvement of symptoms when bending backward	Se 0.16 (0.11, 0.21); Sp 0.78 (0.71, 0.84); +LR 0.70 (0.45, 1.08); -LR 1.08 (0.98, 1.20); +PTP % 45 (34, 56); +PTP absolute differences %: 8.21 (small); -PTP % 55 (53, 58); -PPT absolute differences %: 1.79 (small)
						Exacerbated while standing up	Se 0.92 (0.88, 0.96); Sp 0.20 (0.14, 0.27); +LR 1.2; -LR 0.39
						Wake up to urinate at night	Se 0.86 (0.82, 0.91); Sp 0.27 (0.20, 0.33); +LR 1.2; -LR 0.51
Konno	2007	Primary and secondary	N=468	Consecutive patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs and lower legs	MRI	Bilateral plantar numbness	Se 0.27 (0.21, 0.33); Sp 0.87 (0.83, 0.91); +LR 2.14 (1.45, 3.18); -LR 0.83 (0.76, 0.92); +PTP % 65.88 (57, 74); +PTP absolute differences %: 18.44 (medium); -PTP % 42.82 (41, 45); -PPT absolute differences %: 4.62 (small)
						Leg pain or numbness	Se 0.58 (0.51, 0.64); Sp 0.55 (0.49, 0.62); +LR 1.30 (1.09, 1.56); -LR 0.76 (0.63, 0.92); +PTP % 53.98 (49, 58); +PTP absolute differences %: 6.54 (small); -PTP % 40.68 (36, 46); -PPT absolute differences %: 6.76 (small)
						Low back pain	Se 0.66 (0.60, 0.72); Sp 0.41 (0.35, 0.48); +LR 1.13 (0.98, 1.30); -LR 0.82 (0.64, 1.03); +PTP % 50 (47, 54); +PTP absolute differences %: 2.56 (small);

							-PTP % 42.53 (37, 48); -PPT absolute differences %: 4.91 (small)
						Numbness of perineal region	Se 0.05 (0.02, 0.08); Sp 0.99 (0.96, 1.00); +LR 3.69 (1.03, 13.25); -LR 0.97 (0.94, 1.00); +PTP % 76.90 (48, 93); +PTP absolute differences %: 29.46 (large); -PTP % 46.68 (46, 47); -PPT absolute differences %: 0.76 (small)
Fritz	1997	Tertiary	N=45	Patients with low back and lower extremity pain and self-reported limitations in walking tolerance	MRI and CT scan	Walk better holding onto a shopping cart	Se 0.63 (0.38, 0.84); Sp 0.67 (0.35, 0.90); +LR 1.89 (0.79, 4.53); -LR 0.55 (0.27, 1.13); +PTP % (95% CI): 75 (56, 88) ; +PTP absolute differences %: 14 (medium) ; -PTP % (95% CI): 47 (30, 64) ; -PPT absolute differences %: 14 (medium)
Roach	1997	Tertiary	N=106	Patients with recurrent or chronic low back pain	Patient's complaints, results of physical examination, diagnostic radiologic tests, laboratory work, consultations, and any other diagnostic tests	Pseudoclaudication	Se 0.63 (0.41, 0.81); Sp 0.71 (0.60, 0.80); +LR 2.20 (1.38, 3.50); -LR 0.52 (0.31, 0.89); +PTP % 39.16 (29, 50); +PTP absolute differences (%): 16.52 (medium); -PTP % 13.20 (8, 21); -PPT absolute differences (%): 9.44 (small)
Katz	1995	Tertiary	N=75	Patients with low back pain with or without radiation to the lower extremities	The expert attending physician's confidence in the diagnosis of LSS (>80% confidence in diagnosis for cases and <20% for non-cases)	No pain with flexion	Se 0.79 (0.64, 0.90); Sp 0.44 (0.26, 0.62); +LR 1.41 (1.00, 1.98); -LR 0.48 (0.24, 0.96); +PTP % 65.45 (57, 73); +PTP absolute differences %: 25.12 (large); -PTP % 39.20 (24, 56); -PPT absolute differences %: 1.13 (small)
						No pain when seated	Se 0.47 (0.31, 0.62); Sp 0.94 (0.79, 0.99); +LR 7.21 (1.82, 28.61); -LR 0.57 (0.43, 0.77); +PTP % 90.64 (71, 97); +PTP absolute differences %: 33.31 (large); -PTP % 43.36 (37, 51); -PPT absolute differences %: 13.97 (medium)
						Numbness	Se 0.63 (0.47, 0.77); Sp 0.59 (0.41, 0.76); +LR 1.50 (0.93, 2.40); -LR 0.64 (0.39, 1.05); +PTP % 66.83 (56, 77); +PTP absolute differences %: 9.50 (small); -PTP % 46.23 (34, 58); -PPT absolute differences %: 11 (medium)

						Pain below buttocks	Se 0.88 (0.75, 0.96); Sp 0.34 (0.19, 0.53); +LR 1.35 (1.02, 1.77); -LR 0.34 (0.13, 0.88); +PTP % 64.46 (58, 70); +PTP absolute differences %: 7.13 (small); -PTP % 31.35 (16, 55); -PPT absolute differences %: 25.98 (large)
						Pain below knees	Se 0.56 (0.40, 0.71); Sp 0.63 (0.44, 0.79); +LR 1.49 (0.88, 2.50); -LR 0.71 (0.46, 1.09); +PTP % 66.68 (55, 77); +PTP absolute differences %: 9.35 (small); -PTP % 52 (41, 62); -PPT absolute differences %: 5.33 (small)
						Severe lower extremity pain	Se 0.65 (0.49, 0.79); Sp 0.66 (0.47, 0.81); +LR 2.02 (1.16, 3.52); -LR 0.51 (0.32, 0.83); +PTP % 73.07 (61, 82); +PTP absolute differences %: 15.74 (medium); -PTP % 40.66 (31, 53); -PPT absolute differences %: 16.67 (medium)

Diagnostic accuracy of self-report and subjective history in the diagnosis of low back pain with non-specific lower extremity symptoms: A systematic review (Shultz, 2015)

PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Beattie	2000	NA	N=428	Patients with low back pain or lower extremity radiculopathy	MRI	Lower extremity pain for LSS	DOR: 2.09 (1.03,4.26)

Diagnosis of Lumbar Spinal Stenosis An Updated Systematic Review of the Accuracy of Diagnostic Tests (De Schepper, 2013)

PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Cook	2011	Tertiary	N=1448	Consecutive patients with suspicion of a condition associated with origin at the lumbar spine	Expert opinion based on clinical findings and imaging (MRI)	Pain with walking/standing	Se 0.67 (0.64, 0.69); Sp 0.44 (0.42, 0.46); +LR 1.2; -LR 0.75
						Sitting relieves pain	Se 0.26 (0.24, 0.29); Sp 0.86 (0.84,0.88); +LR 1.9, -LR 0.86

Sugiokia	2008	Primary and secondary	N=469	Consecutive patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs and lower legs	Consensus diagnostic impression of expert physicians, confirmation by x-rays and MRI	Exacerbated while standing up	Se 0.92 (0.88, 0.96); Sp 0.20 (0.14, 0.27); +LR 1.2; -LR 0.39
						Treatment for symptoms needs to be repeated every year	Se 0.40 (0.33, 0.47); Sp 0.81 (0.75, 0.86); +LR 2.1; -LR 0.74
						Wake up to urinate at night	Se 0.86 (0.82, 0.91); Sp 0.27 (0.20, 0.33); +LR 1.2; -LR 0.51
Konno	2007	Primary and secondary	N=468	Patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs and lower legs	Consensus diagnostic impression of expert physicians, confirmation by x-rays and MRI	Burning sensation around the buttocks and/or intermittent priapism associated with walking	Se 0.06 (0.03, 0.09); Sp 0.99 (0.98, 1.00); +LR 7.2; -LR 0.95
						Intermittent claudication	Se 0.82 (0.77, 0.87); Sp 0.78 (0.73, 0.83); +LR 3.7; -LR 0.23
						Exacerbation when standing up	Se 0.68 (0.62, 0.74); Sp 0.70 (0.65, 0.76); +LR 2.3; -LR 0.45
						Improvement when bending forward	Se 0.52 (0.45, 0.58); Sp 0.92 (0.88, 0.95); +LR 6.4; -LR 0.52
						Urinary disturbance	Se 0.14 (0.09, 0.19); Sp 0.98 (0.96, 1.00); +LR 6.9; -LR 0.88
Fritz	1997	Tertiary	N=45	Patients with low back and lower extremity pain and self-reported limitations in walking tolerance	MRI or CT scan	Pain in legs relieved by sitting	Se 0.81 (0.61, 0.93); Sp 0.16 (0.03, 0.40); +LR 1.0; -LR 1.2
						Sitting best posture with regard to symptoms	Se 0.89 (0.70, 0.98); Sp 0.39 (0.17, 0.64); +LR 1.5, -LR 0.28
						Walk/stand worst posture with regard to symptoms	Se 0.89 (0.70, 0.98); Sp 0.33 (0.13, 0.59); +LR 1.3, -LR 0.33
Roach	1997	Tertiary	N=106	Patients with recurrent or	Patient's complaints, results of physical examination,	Radiating leg pain	Se 0.94; Sp 0.21; +LR 1.2; -LR 0.29

				chronic low back pain	diagnostic radiologic tests, laboratory work, consultations, and any other diagnostic tests		
Katz	1995	Tertiary	N=75	Patients with low back pain with or without radiation to the lower extremities	Expert opinion (>80% confidence in diagnosis for cases and <20% for non-cases)	Symptoms improve when seated	Se 0.52 (0.37,0.67); Sp 0.83 (0.70,0.96); +LR 3.1; -LR 0.58
						Worse when walking	Se 0.71 (0.57,0.85); Sp 0.30 (0.14,0.46); +LR 1.0; -LR 0.97
Ljunggren	1991	Secondary	N=179	Consecutive patients with lumbago-sciatica and no previous back surgery.	Diagnosis by physical and neurological examination, imaging and surgery	Pain relief with assuming a suitable body position	Se 0.61 (0.50,0.72); Sp 0.55 (0.45, 0.65); +LR 1.4; -LR 0.71
						Bilateral buttock or leg pain	Se 0.51 (0.40,0.62); Sp 0.92 (0.87,0.97); +LR 6.3; -LR 0.54
						Lumbosacral pain	Se 0.75 (0.65,0.84); Sp 0.27 (0.18,0.36); +LR 1.0; -LR 0.94
						Gluteal pain	Se 0.84 (0.75,0.92); Sp 0.05 (0.01,0.09); +LR 0.88; -LR 3.3
						Thigh pain	Se 0.95 (0.90,1.00); Sp 0.14 (0.07,0.20); +LR 1.1, -LR 0.37
						Calf pain	Se 0.91 (0.85,0.97); Sp 0.06 (0.01, 0.11); +LR 0.97; -LR 1.5
						Foot pain	0.57 (0.46–0.68) 0.27 (0.18–0.36) 0.78 1.6

Table S3: Diagnostic accuracy of physical examination findings for LSS

Systematic review of diagnostic accuracy of patient history, clinical findings, and physical tests in the diagnosis of lumbar spinal stenosis (Cook, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Dobbs	2016	NA	N= 30	Subjects aged 50 or over with subjective report of unilateral or bilateral pain or paraesthesia radiating below the gluteal fold	MRI	Modified extension test	Se 0.92 (0.74, 0.99); Sp 0.40 (0.05, 0.85); +LR 1.53 (0.74, 1.36); -LR 0.20 (0.00, 1.36); +PTP % (95% CI): 88 (79, 94); +PTP absolute differences (%): 5 (small); -PTP % (95% CI): 50 (17, 85); -PPT absolute differences (%): 33 (large)
Konno	2007	Primary and secondary	N=468	Consecutive patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs, and lower legs	Consensus diagnostic impression of expert physicians, confirmation by x-rays and MRI	Straight leg raising test positive	Se 0.17 (0.12, 0.22); Sp 0.67 (0.61, 0.73); +LR 0.51 (0.36, 0.72); -LR 1.24 (1.12, 1.38); +PTP % 31.52 (25, 39); +PTP absolute differences (%): 15.92 (medium); -PTP % 52.81 (50, 55); -PPT absolute differences (%): 5.37 (small)
						Symptoms induced by having patients bend forward	Se 0.18 (0.13, 0.23); Sp 0.63 (0.56, 0.69); +LR 0.48 (0.34, 0.66); -LR 1.31 (1.17, 1.47); +PTP % 30.22 (23, 37); +PTP absolute differences (%): 17.22 (medium); -PTP % 54.17 (51, 57); -PPT absolute differences (%): 6.73 (small)
						Symptoms induced by having patients bend backward	Se 0.70 (0.63, 0.76); Sp 0.54 (0.48, 0.61); +LR 6.34 (4.09, 9.84); -LR 0.53 (0.46, 0.61); +PTP % 58 (54, 62); +PTP absolute differences (%): 10.56 (small); -PTP % 32.35 (28, 39); -PPT absolute differences (%): 15.09 (medium)
Fritz	1997	Tertiary	N=45	Patients with low back and	MRI or CT scan	Prolonged recovery after level walking	Se 0.82 (0.60, 0.95); Sp 0.68 (0.43, 0.87); +LR 2.59 (1.30, 5.17); -LR 0.26 (0.10, 0.68); +PTP % (95%

				lower extremity pain and self-reported limitations in walking tolerance			CI): 75 (60, 86) ; +PTP absolute differences (%): 21 (medium); -PTP % (95% CI): 24 (10, 44); -PPT absolute differences (%): 30 (large)
						Two-stage treadmill test (on a level; earlier onset of symptoms with level walking)	Se 0.68 (0.46, 0.85); Sp 0.83 (0.59, 0.96); +LR 4.0 (1.40, 11.86); -LR 0.38 (0.21, 0.71); +PTP % (95% CI): 84.55 (66, 94) ; +PTP absolute differences (%): 26.55 (large); -PTP % (95% CI): 34.21 (23, 50); -PPT absolute differences (%): 23.79 (medium)
						Two-stage treadmill test (on an inclined treadmill; longer total walking time during inclined walking)	Se 0.50 (0.25, 0.75); Sp 0.92 (0.64, 1.00); +LR 6.50 (0.93, 45.50); -LR 0.54 (0.32, 0.91); +PTP % (95% CI): 89.89 (53, 98) ; +PTP absolute differences (%): 34.89 (large) ; -PTP % (95% CI): 40 (28, 53); -PPT absolute differences (%): 15 (medium)
						Thigh pain with 30 s of lumbar extension	Se 0.51 (0.35, 0.67); Sp 0.69 (0.50, 0.84); +LR 1.64 (0.91, 2.96); -LR 0.71 (0.48, 1.04); +PTP % 68.78 (55, 80); +PTP absolute differences %: 11.45 (medium); -PTP % 48.82 (39, 58); -PPT absolute differences %: 8.51 (small)
						Abnormal Romberg	Se 0.40 (0.25, 0.56); Sp 0.91 (0.75, 0.98); +LR 4.06 (1.29, 12.76); -LR 0.68 (0.53, 0.89); +PTP % 84.50 (64, 95); +PTP absolute differences (%): 27.17 (large); -PTP % 47.74 (41, 54); -PPT absolute differences (%): 8.87 (small)
Katz	1995	Tertiary	N=75	Patients with low back pain with or without radiation to the lower extremities	Expert opinion (>80% confidence in diagnosis for cases and <20% for non-cases)	Absent Achilles reflex	Se 0.47 (0.31, 0.62); Sp 0.78 (0.60, 0.91); +LR 2.07 (0.99, 4.31); -LR 0.70 (0.50, 0.98); +PTP % 73.55 (58, 85); +PTP absolute differences (%): 16.22 (medium); -PTP % 48.46 (40, 56); -PPT absolute differences (%): 8.87 (small)
						Pinprick deficit (sensitivity)	Se 0.47 (0.31, 0.62); Sp 0.81 (0.64, 0.93); +LR 2.54 (1.16, 5.58); -LR 0.64 (0.46, 0.90); +PTP % 77.33 (61, 88); +PTP absolute differences (%): 20 (medium); -PTP % 46.23 (39, 55); -PPT absolute differences (%): 11.10 (medium)
						Poor balance	Se 0.70 (0.54, 0.83); Sp 0.53 (0.35, 0.71); +LR 1.49 (0.98, 2.26); -LR 0.57 (0.33, 0.99); +PTP % 66.68 (57, 75); +PTP absolute differences (%): 9.35

[illegible]

First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Cook	2011	Tertiary	N=1448	Consecutive patients with suspicion of a condition associated with origin at the lumbar spine	Expert opinion based on clinical findings and imaging (MRI)	Gait abnormality	Se 0.29 (0.27, 0.32); Sp 0.81 (0.79, 0.83); +LR 1.6; -LR 0.87
Katz	1995	Tertiary	N=75	Patients with low back pain with or without radiation to the lower extremities	Expert opinion (>80% confidence in diagnosis for cases and <20% for non-cases)	Wide-based gait	Se 0.43 (0.28, 0.58); Sp 0.97 (0.91,1.00); +LR 14; -LR 0.59

Table S4: Diagnostic accuracy of clinical diagnostic support tool for LSS

Diagnostic Clinical Prediction Rules for Specific Subtypes of Low Back Pain: A Systematic Review (Haskins, 2015)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Sugiokia	2008	Primary and secondary	N=469	Patients showing primary symptoms of pain or numbness in the lower limbs, including the buttocks, thighs and lower legs	Physician-diagnosed LSS	Clinical prediction rule (score ≥ 5 : older age, duration of symptoms > 6m, improvement of symptoms when bending backward, occurrence of symptoms when standing up, improvement of symptoms while resting, urinary incontinence	Se 0.75; Sp 0.51; LRs not reported but calculated to be LR+ 1.5 (1.1, 2.1); LR- 0.50 (0.29, 0.88)
Diagnosis of Lumbar Spinal Stenosis An Updated Systematic Review of the Accuracy of Diagnostic Tests (De Shepper, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Cook	2011	Tertiary	N=1448	Consecutive patients with suspicion of a condition associated with origin at the lumbar spine	Expert opinion based on clinical findings and imaging (MRI)	1 of 5 positive findings (bilateral symptoms, leg pain more than back pain, pain during walking/standing, pain relief upon	Se 0.96 (0.94, 0.97); Sp 0.20 (0.19, 0.21); +LR 1.2, -LR 0.19

						sitting, age > 48 yr)	
						2 of 5 positive findings	Se 0.68 (0.65,0.71); Sp 0.62 (0.60, 0.64); +LR 1.8 ; -LR 0.51
						3 of 5 positive findings	Se 0.29 (0.27,0.31); Sp 0.88 (0.87,0.90); +LR 2.5; -LR 0.80
						4 of 5 positive findings	Se 0.06 (0.05, 0.07); Sp 0.98 (0.98, 0.99); +LR 4.6; -LR 0.95
Kato	2009	Secondary	N=119	Patients with symptoms in lower extremities	Consensus diagnostic impression of expert physicians, confirmation by x-rays, CT and MRI	Clinical diagnostic support tool (LSS ≥ 7)	Se 0.95 (0.89, 1.00); Sp 0.40 (0.28,0.52); +LR 1.6; -LR 0.13
Konno	2007	Primary and secondary	N=468	Consecutive patients showing primary symptoms of pain or numbness in the lower extremities, including the buttocks, thighs, and lower legs	Consensus diagnostic impression of expert physicians, confirmation by x-rays and MRI	Clinical diagnostic support tool (LSS ≥ 7)	Se 0.95 (0.89, 1.00); Sp 0.40 (0.28,0.52); +LR 1.6; -LR 0.13

Table S5: Diagnostic accuracy of demographics for lumbar radiculopathy

Diagnostic utility of patient history, clinical examination and screening tool data to identify neuropathic pain in low back related leg pain: a systematic review and a narrative synthesis (Mistry, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Verwoerd	2014	Secondary	N=395	Adults patients diagnosed by neurologist with incapacitating	MRI	Age > 40	(Nerve root compression/herniated disc): Se 57%/58%; Sp 37%/36%; LR+ 0.9/0.9; LR- 1.16/1.17

				lumbosacral radicular syndrome		Male sex	Se 66%/65%; Sp 47%/45%; LR+1.25/1.18; LR- 0.23/0.78
						BMI ≥ 30	Se 13%/12%; Sp 78%/72%; LR+ 0.59/0.43; LR- 0.74/0.74
						Health-related absenteeism	Se 80%/81%; Sp 20%/24%; LR+ 1/0.7; LR- 1/0.79
						Having an intellectually heavy job	Se 69%/69%; Sp 42%/42%; LR+ 1.19/1.19; LR- 0.74/0.74
						Having a physically heavy job	Se 38%/39%; Sp 57%/60%; LR+ 0.95/0.95; LR- 1.05/1.03
						Smoking	Se 39%/39%; Sp 58%/59%; LR+ 0.95/0.95; LR- 1.05/1.03
Diagnostic accuracy of self-report and subjective history in the diagnosis of low back pain with non-specific lower extremity symptoms: A systematic review (Shultz, 2015)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Coster	2010	Tertiary	N= 202	Patients had suspicion of lumbosacral radiculopathy	Radiological nerve root compression	Age > 40 years	DOR: 1.20 (0.60, 2.20)
						Gender male	DOR: 1.70 (0.90, 3.00)
Vroomen	2002	Primary and secondary	N=274	Patients with pain radiating into the leg	MRI	Age 41-50	DOR: 1.30 (0.70, 2.30)
						Age 51-81	DOR: 2.20 (1.20, 4.00)
						Male Sex	DOR: 1.80 (1.10, 3.00)
						Living Alone	DOR: 1.30 (1.70, 2.40)
						High Education Level	DOR: 1.60 (0.90, 2.90)
						Job Type: Cognitive	DOR: 1.10 (0.60, 2.00)
						Job Type: Standing/walking/lifting	DOR: 0.50 (0.30, 0.95)
Vucetic	1997	NA	N=274	Patients with pain radiating into the leg (suspicion of LDH)	MRI	Education	DOR: 3.22 (1.30, 7.80)

Table S6: Diagnostic accuracy of patient history findings for lumbar radiculopathy

Diagnostic utility of patient history, clinical examination and screening tool data to identify neuropathic pain in low back related leg pain: a systematic review and a narrative synthesis (Mistry, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Verwoerd	2014		N=395	Adults patients diagnosed by neurologist with incapacitating lumbosacral radicular syndrome	MRI	Duration of pain in leg \geq 9 weeks	(Nerve root compression/herniated disc): Se 26%/25%; Sp 73%/71%; LR+ 0.96/0.86; LR- 1.01/1.06
						Pain worse in leg than back	Se 53%/52%; Sp 59%/59%; LR+ 1.29/1.27; LR- 0.8/0.81
						Having pain in the back > 12 weeks	Se 34%/36%; Sp 58%/61%; LR+ 0.81/0.92; LR- 1.14/1.25
						Sudden onset	Se 58%/60%; Sp 24%/24%; LR+ 0.76/0.79; LR- 1.75/0.53
						Paroxysmal pain	Se 38%/39%; Sp 59%/61%; LR+ 1.29/1.27; LR- 0.8/0.81
						Having had pain in the same leg previously	Se 12%/12%; Sp 90%/91%; LR+ 1.2/1.2; LR- 0.98/0.98
						Subjective sensory loss	Se 89%/90%; Sp 18%/25%; LR+ 1.09/1.2; LR- 0.61/0.13
						Subjective muscle weakness	Se 66%/67%; Sp 27%/31%; LR+ 0.9/0.97; LR- 1.63/1.06
						Positive family history	Se 42%/43%; Sp 62%/67%; LR+ 0.88/1.3; LR- 0.94/1.73
						Pain worse on coughing/sneezing/straining	Se 71%/71%; Sp 32%/31%; LR+ 1.04/1.03; LR- 0.91/0.94
						Worsening on sitting	Se 73%/73%; Sp 22%/22%; LR+ 0.94/0.94; LR- 1.23/1.23

**Diagnostic accuracy of self-report and subjective history in the diagnosis of low back pain with non-specific lower extremity symptoms: A systematic review
(Shultz, 2015)**

PRIMARY STUDIES

First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Smart	2012	Secondary	N=102	Patients >18 years of age with low back (\pm leg) pain referred for physiotherapy assessment and/or treatment	Experienced clinical judgment regarding the likely dominant mechanisms	History of nerve injury	DOR: 12.64 (3.59, 44.49)
						Dermatomal distribution	DOR: 24.29 (6.33, 93.19)
Coster	2010	Tertiary	N= 202	Patients had suspicion of lumbosacral radiculopathy	Radiological nerve root compression	Duration of symptoms 3-12w	DOR: 1.40 (0.80, 2.60)
						Lumbago	DOR: 1.10 (0.50, 2.20)
						HNP Surgery	DOR: 0.50 (0.20, 1.10)
						Diabetes Mellitus	DOR: 0.80 (0.20, 3.00)
						Physiotherapy	DOR: 1.10 (0.60, 1.90)
						Use of pain killers	DOR: 1.70 (0.80, 3.60)
						Dermatomal radiation	DOR: 4.10 (2.20, 7.80)
						More pain on coughing, sneezing or straining	DOR: 3.20 (1.80, 5.70)
						More pain on sitting	DOR: 1.90 (1.10, 3.40)
						Less pain on standing	DOR: 0.90 (0.50, 1.50)
						Less pain on lying down	DOR: 1.50 (0.80, 2.90)
						Subjective muscle weakness	DOR: 2.20 (1.20, 4.00)
						Subjective sensory loss	DOR: 2.10 (1.00, 4.20)
						Disturbed Urinary Passage	DOR: 2.3 (0.20, 25.60)
Vroomen	2002	Primary and secondary	N=274	Patients with pain radiating into the leg	MRI	Duration 15-30 days	DOR: 1.70 (0.90, 3.20)
						Duration >30 days	DOR: 0.70 (0.40, 1.20)
						Any Comorbidity	DOR: 1.30 (0.80, 2.10)
						Smoking	DOR: 0.70 (0.40, 1.10)
						Sports Activities	DOR: 1.10 (0.70, 2.2)
						Exercised back/abd muscles	DOR: 0.80 (0.50, 1.30)
						Family History Sciatica	DOR: 1.10 (0.70, 1.90)

Beattie	2000		N=428	Patients with low back pain or lower extremity radiculopathy	MRI	Leg pain for lumbar radiculopathy	DOR: 2.35 (1.36, 4.06)
						Weakness for LDH	DOR: 1.86 (.99, 3.50)
Vucetic	1997	NA	N=274	Patients with pain radiating into the leg (suspicion of LDH)	MRI	Duration of sciatica (week)	DOR: 0.76 (0.41, 1.11)
						Progressive Sciatic Pain	DOR: 2.77 (1.20, 6.30)
						Previous non-spinal surgery	DOR: 3.52 (1.60, 8.00)

Table S7: Diagnostic accuracy of physical examination findings for lumbar radiculopathy

Diagnostic utility of patient history, clinical examination and screening tool data to identify neuropathic pain in low back related leg pain: a systematic review and a narrative synthesis (Mistry, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Lin	2017	Tertiary	N=60	Patients with back pain with or without leg pain lasting > 3 months	MRI	Low strength	Se 82; Sp 92; LR+ 10.25; LR- 2.25
						High strength	Se 73; Sp 97; LR+ 24.33; LR- 0.97
						Pinprick	Se 55; Sp 100; LR+ 0; LR- 0.45
						Brush	Se 46; Sp 100; LR+ 0; LR- 0.54
						Blunt	Se 59; Sp 97; LR+ 10.67; LR- 0.42
						Vibration	Se 59; Sp 92; LR+ 7.38; LR- 0.45
						Warm	Se 68; Sp 97; LR+ 22.67; LR- 0.33
Urban	2015	Secondary	N=21	Patients with LBP with or without leg pain, 25 years or >	Standard clinical assessment	Slump test	Se 91; Sp 70; LR+ 3.03; LR- 0.13
Walsh	2009	NA	N=45	Patients with unilateral LBLP	SLR + slump tests	Nerve palpation: 2 more of sciatic, tibial, common peroneal	Se 83; Sp 73; LR+ 3.07; LR- 0.23

Poiraudau	2001	Secondary	N=78	Patients hospitalised for acute or chronic sciatica of mechanical origin	MRI, CT, saccoradiculography	Bell's test	Se 46; Sp 62; LR+ 1.21; LR- 0.87
						HE test	Se 44; Sp 67; LR+ 1.33; LR- 0.83
						Lasegue signs	Se 79; Sp 37; LR+ 1.25; LR- 0.57
						Crossed Lasegue sign	Se 29; Sp 83; LR+ 0.41; LR- 0.85
Accuracy of clinical neurological examination in diagnosing lumbo-sacral radiculopathy: a systematic literature review (Tawa, 2017)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Iversen	2013	Outpatient multidisciplinary back clinics	N=116	Patients with history & clinical presentation suggestive of chronic lumbar radiculopathy	MRI and CT	Sensory tests	Se 0.33 (0.06, 0.79); Sp 0.88 (0.81, 0.93); +LR 2.8; -LR 1.3
						Motor tests	Se 0.33 (0.06, 0.97); Sp 0.68 (0.59, 0.76); +LR 1.0; -LR 1.0
						Patellar reflex	Se 0.67 (0.21, 0.94); Sp 0.83 (0.75, 0.89); +LR 4.0; -LR 2.5
						Achilles reflex	Se 0.67 (0.21,0.94); Sp 0.60 (0.51, 0.69); +LR 1.7, -LR 1.8
Suri	2011	Hospital spine center	N=54	Patients with lower extremity radiating pain	MRI	Motor tests	L3: Se 0.50 (0.19, 0.81); Sp 0.77 (0.62, 0.89); +LR 2.2; -LR 1.5; L4: Se 0.54 (0.25, 0.81), Sp 0.80 (0.65, 0.91); +LR 2.7; -LR 1.7; L5: Se 0.61 (0.36, 0.83); Sp 0.86 (0.71, 0.95); +LR 4.4; -LR 2.2; S1: Se 0.29 (0.10, 0.56); Sp 0.97 (0.85, 1.00); +LR 1.0; -LR 1.4
						Achilles reflex	Se 0.33 (0.13, 0.59); Sp 0.91 (0.77, 0.98); +LR 3.7; -LR 1.4
						SLR	Se 0.29 (0.28, 0.32); Sp 0.57 (0.48, 0.58); +LR 0.7; -LR 0.8
Trainor	2011	Orthopedic spinal clinic	N=16	Patients with pain radiating into one or both legs distal to the groin or gluteal fold	MRI	Slump test	Se 1.00 (0.40, 1.00); 0.83 (0.52, 0.98); +LR 5.9; -LR 0.8

				Distribution of pain in dermatomal pattern			
Coster	2010	Tertiary	N=202	Subjects referred by general practitioners with clinical suspicion of Lumbo-Sacral Radicular Syndrome (LSRS)	EMG	Patellar reflex	Se 0.18 (0.10, 0.18); Sp 0.66 (0.58, 0.71); +LR 0.5; -LR 0.8
						SLR	Se 0.44 (0.38, 0.52); Sp 1.00 (0.48, 1.00); +LR 0.4; -LR 1.8
Suri	2010	Hospital spine center	N=51	Patients presenting with lower extremity radiating pain and MRI- visible lumbar disk herniation.	MRI	Sensory (soft touch & pin prick)	L2: Se 0.08 (0.01, 0.27); Sp 0.96 (0.82, 1.00); +LR 2.0; -LR 1.0; L3: Se 0.17 (0.05, 0.37); Sp 0.96 (0.82, 1.00); +LR 4.3; -LR 1.2; L4: Se 0.17 (0.05, 0.37); Sp 1.00 (0.88, 1.00); +LR 0.2; -LR 1.2; L5: Se 0.13 (0.03, 0.34); Sp 0.82 (0.63, 0.94); +LR 0.7; -LR 0.9; S1: Se 0.08 (0.01, 0.27); Sp 0.79 (0.59, 0.92); +LR 0.4; -LR 0.9
						Motor (heel raise & sit-to-stand)	Se 0.39 (0.32, 0.52); Sp 0.83 (0.78, 0.87); +LR 2.3; -LR 1.4
						Patellar reflex	Se 0.32 (0.31, 0.53); Sp 0.90 (0.89, 0.95); +LR 3.2; -LR 1.3
						SLR	Se 0.64 (0.47, 0.82); Sp 0.48 (0.45, 0.50); +LR 1.2; -LR 1.3
Bertilson	2010	Radiology clinic	N=61	Patients referred for lumbar spine MRI	MRI	Sensory (soft touch & pain prick)	L4: Se 0.07 (0.01, 0.22); Sp 0.81 (0.63, 0.93); +LR 0.4; -LR 0.9; L5: Se 0.17 (0.06, 0.35); Sp 0.58 (0.39, 0.75); +LR 0.4; -LR 0.7; S1: Se 0.20 (0.08, 0.39); Sp 0.84 (0.66, 0.95); +LR 1.3; -LR 1.1
						Motor (hypotrophy)	L4: Se 0.13 (0.04, 0.31); Sp 0.87 (0.28, 3.76); +LR 1.0; -LR 1.0; L5: Se 0.27 (0.12, 0.46); Sp 0.68 (0.49,

							0.83); +LR 0.8; -LR 0.9; S1 : Se 0.17 (0.06, 0.35); Sp 0.81 (0.63, 0.93); +LR 0.9; -LR 1.0
Majlesi	2008	Secondary	N=180	Patients with complaints suggestive of lumbar disc herniation with low back, leg, or low back and leg pain	MRI	SLR	Se 0.52 (0.42, 0.58); Sp 0.89 (0.79, 0.95); +LR 4.7; -LR 1.9
						Slump test	Se 0.84 (0.74, 0.90); Sp 0.83 (0.73, 0.90); +LR 5.0; -LR 5.2
Rabin	2007	Tertiary	N=38	Low back pain or paraesthesia radiation below the knee	MRI	Seated SLRT and supine SLRT	Se 0.67 (0.53, 0.79); Sp 0.43 (0.38, 0.46); +LR 1.0; -LR 1.3
Vroomen	2002	Primary	N=58	Patients referred to the neurology department with a new episode of pain radiating into the leg below the gluteal fold	MRI	Sensory tests	Se 0.14 (0.09, 0.21); Sp 0.93 (0.87, 0.97); +LR 2.0; -LR 1.1
						Motor tests (paresis)	Se 0.27 (0.20, 0.35); Sp 0.93 (0.87, 0.97); +LR 3.9; -LR 1.3
						Achilles reflex	Se 0.14 (0.09, 0.21); Sp 0.93 (0.87, 0.97); +LR 2.0; -LR 1.1
						SLR	Se 0.64 (0.56, 0.71); Sp 0.57 (0.47, 0.66); +LR 1.5; -LR 1.6
Haldeman	1998	Secondary	N=10	Patients with complaints of low-back pain and leg pain, consistent with a diagnosis of sciatica	CT and electro-diagnostics	SLR	Se 0.37 (0.19, 0.58); Sp 0.78 (0.67, 0.87); +LR 1.7; -LR 1.2
Albeck	1996	Secondary	N=80	Patients with mono-radicular pain from L5 or S1	Surgery	Sensory tests	Se 0.61 (0.47, 0.73); Sp 0.63 (0.38, 0.84); +LR 1.6; -LR 1.6
						Motor tests	Se 0.34 (0.23, 0.48); Sp 0.47 (0.24, 0.71); +LR 0.6; -LR 0.7

						Achilles reflex	Se 0.61 (0.47, 0.73); Sp 0.63 (0.38, 0.84); +LR 1.8; -LR 1.6
						SLR	Se 0.84 (0.72, 0.92); Sp 0.21 (0.06, 0.46); +LR 1.1; -LR 1.3
Neurological examination of the peripheral nervous system to diagnose lumbar spinal disc herniation with suspected radiculopathy: a systematic review and meta-analysis (Al Nezari, 2013)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				
Al Nezari	2013	Mixed	N=7200	Patients with LBP with suspicion of radiculopathy caused by a potential LDH	Surgery	Sensory deficits	Se (0.40; CI 0.38, 0.43); Sp (0.59; CI 0.51, 0.67)
					Imaging findings		Se (0.32; CI 0.28, 0.37); Sp (0.72; CI 0.67, 0.77) for diagnosis made at any lumbar segmental level and Se (0.35; CI 0.33, 0.38); Sp (0.64; CI 0.61, 0.66) for diagnosis made at a specific segmental level.
					Surgery	Motor deficits (paresis)	Se (0.22; CI 0.21, 0.23); Sp (0.79; CI 0.77, 0.80); +LRs (1.05; CI 0.87, 1.26)
					Imaging findings		Se (0.40; CI 0.37, 0.42); Sp (0.62; CI 0.60, 0.64); +LRs (1.17; CI 0.99, 1.38)
			Surgery		Motor deficits (atrophy)	Se (0.31; CI 0.26, 0.36); Sp (0.76; CI 0.65, 0.85);+LRs (1.08; CI 0.34, 3.46)	
			Surgery		Reflex deficits	Se (0.29; CI 0.28, 0.30); Sp (0.78; CI 0.76, 0.80); +LRs (1.26; CI 1.01, 1.58);-LR (0.87; CI 0.76, 0.98)	
			Imaging findings			Se (0.25; CI 0.22, 0.28); Sp (0.75; IC 0.73, 0.78); +LR (1.25; CI 0.71, 2.20); -LR (0.96; CI 0.82, 1.12)	

The pain provocation-based straight leg raise test for diagnosis of lumbar disc herniation, lumbar radiculopathy, and/or sciatica: a systematic review of clinical utility (Scaia, 2012)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Capra	2011	NA	N=1305	Patients with suspected lumbar disc herniation, lumbar radiculopathy or sciatica	MRI	SLR	Se 36; Sp 74; +LR 1.39; -LR 0.87
Poiraudeau	2001	Secondary	N=78		Electrodiagnosis		Se 19; Sp 84; +LR 1.19; -LR 0.96
Lauder	2000	NA	N=170		Myelography		Se 96; Sp 10; +LR 1.07; -LR 0.4
Kostelinatz	1984	Secondary	N=100		Myelography		Se 76; Sp 45; +LR 1.38; -LR 0.53
Spangfort	1972	Secondary	N=2377		MRI, CT or Myelography		Se 52; Sp 89; +LR 4.73; -LR 0.54
Knuttson	1961	Secondary	N=206		Myelography		Se 77–83; Sp 36–39; +LR 1.20–1.36; -LR 0.44–0.63
Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain (Van der Windt, 2010)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				
Van der Windt	2010	Primary and secondary care	Cohort studies: Median N = 126, range 71 to 2504; Case control studies: 38 to 100 cases n=19	Patients with low-back pain with pain radiating into the leg (sciatica), who were suspected of having radiculopathy due to disc herniation	Imaging	SLR	Se 0.64 (0.56 to 0.71); Sp 0.57 (0.47 to 0.66)
					Surgery		Se 0.92 (0.87, 0.95); Sp 0.28 (0.18, 0.40); +LR 1.3 (1.1, 1.4); -LR 0.30 (0.24, 0.39)
					Surgery	Crossed SLR	Se 0.28 (0.22, 0.35); Sp 0.90 (0.85, 0.94); +LR 2.1 (1.6, 2.8); -LR 0.86 (0.83, 0.89)
					Surgery	Scoliosis	Se range: 0.39 to 0.68; Sp range: 0.62 to 0.89

					Surgery	Paresis or muscle weakness	Se range: 0.29 to 0.62; Sp range: 0.50 to 0.89
			MRI		Se 0.27 (0.20, 0.37); Sp 0.93 (0.88, 0.97)		
			Surgery		Muscle wasting	Se range: range: 0.15 to 0.38; Sp range: 0.50 to 0.94	
			Surgery		Impaired reflex	Se range: 0.31 to 0.62; Sp range: 0.60 to 0.89	
			MRI			Se 0.15 (0.09, 0.21); Sp 0.93 (0.88, 0.97)	
			Surgery		Sensory deficits	Se range: 0.26 to 0.67; Sp range: 0.42 to 0.69	
			MRI			Se 0.28 (0.21, 0.36); Sp 0.66 (0.56, 0.74)	
			Surgery		Forward flexion	Se range: 0.85 and 0.90; Sp range: 0.16 and 0.29	
			MRI			Se 0.45 (0.37, 0.53); Sp 0.74 (0.65, 0.81)	
			MRI-CT		Extension test (sciatica was reproduced or worsened)	Se range: 0.13 to 0.90; Sp range: 0.17 to 0.94 (depending on cut-off point)	
			MRT-CT		Slump test	Se range: 0.44 to 0.87; Sp range: 0.23 to 0.63 (depending on cut-off point)	
			MRI-CT		Bell test	Se 0.49 (0.33, 0.65); Sp 0.63 (0.45, 0.79)	
The test of Lasègue: systematic review of the accuracy in diagnosing herniated discs. (Deville, 2000)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				

Deyllé	2000	Mixed	NA	Unclear	Surgery	SLR typical (+ SLR reproduces the sciatic pain between 30° and 60–75°. An atypical SLR was defined by three studies as pain produced in the back only)	Se 0.91 (0.82, 0.94); Sp 0.26 (0.16, 0.38); DOR 3.97 (3.22, 4.9)
			n=15			Crossed SLR	Se 0.29 (0.24, 0.34); Sp 0.88 (0.86, 0.90); DOR 4.39 (0.74–25.9)

Table S8: Diagnostic accuracy of demographics for non-specific LBP

Systematic review of patient history and physical examination to diagnose chronic low back pain originating from the facet joints (Maas, 2017)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2006	Secondary	N=120	Adult patients, of either gender, suffering from CLBP	ZI block 95% reduction standard	Age 50 or more	Se 0.62 (0.36, 0.82); Sp 0.77 (0.68,0.84)
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200		Double diagnostic block	Age ≥ 65	Se 0.21 (0.14, 0.31); Sp 0.85 (0.78, 0.91)
						Old age	Se 0.25 (0.17, 0.35); Sp 0.84 (0.77, 0.90)
						Positive work status	Se 0.34 (0.23, 0.47); Sp 0.62 (0.51, 0.72)
						BMI (normal)	Se 0.40 (0.30, 0.51); Sp 0.69 (0.60, 0.77)
Manchikanti	1999		N=120			Age > 65	Se 0.19 (0.10, 0.31); Sp 0.82 (0.71, 0.89)
						Gender male	Se 0.39 (0.27, 0.52); Sp 0.56 (0.44, 0.67)
Revel	1998	Tertiary	N=80		75% response on Lidocaine block	Age > 65	Se 0.38 (0.18, 0.64); Sp 0.74 (0.62, 0.90)
Diagnostic utility of patient history and physical examination data to detect spondylolysis and spondylolisthesis in athletes with low back pain: A systematic review (Grodahl, 2016)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Gregg	2009	Sports medicine clinic	N=71	All patients with LBP referred for a SPECT scan to confirm suspected diagnosis of spondylolysis	SPECT scan	Age at bone scan (<20 yrs)	Se 80.77; Sp 43.64
						Gender male	Se 73.08; Sp 57.4
Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain (Hancock, 2007)							

PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200	Patients presenting to private pain management centre, with chronic LBP +/- lower extremity pain	Intra-articular local anaesthetic blocks for SIJ pain; and either intra-articular blocks or medial branch blocks for facet joint pain.	Age > 65	Se 22 (14, 32); Sp 85 (77, 91); +LR 1.5 (0.8, 2.6); -LR 0.92 (0.80, 1.05)
Manchikanti	1999		N=120			Age > 65	Se 19 (10, 32); Sp 66 (54,78); +LR 0.6 (0.3, 1.1); -LR 1.21 (0.98, 1.51)
Revel	1998	Tertiary	N=42	Patients with LBP >3/12 referred for facet injection		Age > 65	Se 39 (15, 68); Sp 78 (60,91); +LR 1.8 (0.7,4.7); -LR 0.78 (0.49, 1.23)

Table S9: Diagnostic accuracy of patient history findings for non-specific LBP

Low back pain of disc, sacroiliac joint, or facet joint origin: a diagnostic accuracy systematic review (Han, 2023)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Depalma	2011	Tertiary care	N=160	Patients with LBP that was either recalcitrant to spine-focused physical therapy, oral analgesics, or oral anti-inflammatory medication	Discography with a concordant pain provocation score of 6 out of 10 or greater and an adjacent pain-free control disc	Midline LBP (for pain originating from the disc)	Se 95.8 (88.1, 99.1); Sp 74.7 (65.0, 82.9); LR+ 3.79 (2.69, 5.34); LR- 0.06 (0.02, 0.17)
						Para-midline LBP (for pain originating from the disc)	67.3 (52.9 to 79.7) 9.3 (3.8 to 18.3) 3.50 (1.56 to 7.84) 0.74 (0.61 to 0.91)
					Greater than or equal to 80% pain relief with double blocks	Absence of midline LBP (for facet joint origin)	Se 15.4 (6.9, 28.1); Sp 28.0 (20.1, 37.0); LR+ 3.03 (2.22, 4.13); LR- 0.21 (0.11, 0.41)
						Para-midline LBP (for facet joint origin)	Se 95 (83.1, 99.4); Sp 25.3 (16.6, 35.7); LR+ 1.27 (1.10, 1.47); LR- 0.20 (0.05, 0.80)
					Greater than or equal to 50% pain relief with SIJ double blocks	Absence of midline LBP (pain originating from the SIJ)	Se 12.9 (3.6, 29.8); Sp 36.0 (28.0, 44.5); LR+ 2.42 (1.87, 3.14); LR- 0.20 (0.08, 0.51)
						Absence of midline LBP (pain originating from the SIJ)	Se 96 (79.6, 99.9); Sp 22.5 (14.9, 31.9); LR+ 1.24 (1.09, 1.41); LR- 0.18 (0.03, 1.25)
Lewinnek	1986	NA	N=21	Patients with LBP	Greater than or equal to 80% pain relief with double blocks	Wakes from sleep (for pain originating from the facet joint)	Se 58.3 (27.7, 84.8); Sp 94.1 (56.7, 100.0); LR+ 9.92 (0.65, 152.24); LR- 0.44 (0.22, 0.88)

						Acute onset	Se 95.2 (63.3, 100.0); Sp 50.0 (18.7, 81.3); LR+ 1.91 (1.01, 3.59); LR- 0.10 (0.01, 1.53)
						Pain below knee	Se 88.9 (51.8, 99.7); Sp 63.6 (30.8, 89.1); LR+ 2.44 (1.08, 5.52); LR- 0.18 (0.03, 1.17)
						Sitting increases pain	Se 63.6 (30.8, 89.1); Sp 83.3 (35.9, 99.6); LR+ 3.82 (0.60, 24.14); LR- 0.44 (0.19, 1.03)
						Time-dependent positional distress	Se 78.6 (49.2, 95.3); Sp 66.7 (22.3, 95.7); LR+ 2.36 (0.74, 7.55); LR- 0.32 (0.10, 1.02)
						NSAID helped	Se 50.0 (11.8, 88.2); Sp 91.7 (61.5, 99.8); LR+ 6.00 (0.78, 46.14); LR- 0.55 (0.24, 1.24)
Systematic review of patient history and physical examination to diagnose chronic low back pain originating from the facet joints (Maas, 2017)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Jung	2007	Secondary	N=259	Patients had pain lasting more than 3 months and pain intensity greater than 5 on the NRS	Single or double diagnostic nerve blocks	Paravertebral area	Se 0.64 (0.55, 0.72); Sp 0.65 (0.56, 0.72)
						Paravertebral area combined to leg pain in the posterior thigh and calf	Se 0.11 (0.07, 0.18); Sp 0.94 (0.88, 0.97)
						Paravertebral area combined to leg pain in the posterior thigh only	Se 0.06 (0.03, 0.12); Sp 0.98 (0.95, 0.10)
						Paravertebral area combined	Se 0.05 (0.03, 0.11); Sp 0.93 (0.87, 0.96)

						with leg pain in the calf only	
						Mixed patterns	Se 0.13 (0.08, 0.20); Sp 0.88 (0.81, 0.92)
Laslett	2006	Secondary	N=120	Adult patients, of either gender, suffering from CLBP	ZJ block 95% reduction standard	Best activity is walking	Se 0.31 (0.13, 0.58); Sp 0.92 (0.85, 0.95)
						Best activity is sitting	Sp 0.33 (0.14, 0.61); Sp 0.90 (0.82, 0.94)
						Onset pain is paraspinal	Se 0.75 (0.47, 0.91); Sp 0.72 (0.63, 0.80)
						MSPQ>13	Se 0.46 (0.23, 0.71); Sp 0.70 (0.60, 0.77)
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200		Double diagnostic block	Pain well relieved by supine	Se 0.94 (0.86, 0.97); Sp 0.16 (0.11, 0.24)
						Pain not exacerbated by coughing	Se 0.90 (0.82, 0.95); Sp 0.13 (0.08, 0.20)
						Traumatic onset	Se 0.48 (0.37, 0.58); Sp 0.50 (0.41, 0.59)
						Prior history of LBP	Se 0.70 (0.59, 0.79); Sp 0.25 (0.18, 0.33)
						Post surgery	Se 0.20 (0.13, 0.30); Sp 0.63 (0.54, 0.72)
						Onset occupational	Se 0.14 (0.08, 0.23); Sp 0.72 (0.63, 0.79)
						Positive work status	Se 0.34 (0.23 0.47); Sp 0.62 (0.51, 0.72)
						Duration < 1 year	Se 0.21 (0.14 0.31); Sp 0.79 (0.71, 0.86)
						Low back. hip buttocks pain	Se 0.98 (0.92 0.99); Sp 0.00 (0.00 0.03)
						Bilateral pain	Se 0.76 (0.66 0.84); Sp 0.35 (0.27, 0.44)

						Back pain with groin or thigh	Se 0.35 (0.25, 0.45); Sp 0.68 (0.59, 0.76)
						Pseudoradicular pain	Se 0.51 (0.41, 0.62); Sp 0.43 (0.34, 0.52)
						Leg pain	Se 0.59 (0.48, 0.69); Sp 0.34 (0.26, 0.43)
						Subjective pain $\geq 8/10$	Se 0.38 (0.28, 0.49); Sp 0.66 (0.57, 0.74)
						Cramping pain above knees	Se 0.43 (0.33, 0.54); Sp 0.56 (0.47, 0.65)
						Paresthesia	Se 0.74 (0.64, 0.82); Sp 0.16 (0.11, 0.24)
						Low back pain stiffness	Se 0.58 (0.47, 0.68); Sp 0.38 (0.30, 0.48)
Manchikanti	1999		N=120			Traumatic onset	Se 0.54 (0.41, 0.66); Sp 0.47 (0.35, 0.59)
						Previous surgery	Se 0.17 (0.09, 0.29); Sp 0.67 (0.55, 0.77)
						Duration of pain > 4 years	Se 0.56 (0.42, 0.68); Sp 0.64 (0.52, 0.76)
Revel	1998	Tertiary	N=80		75% response on Lidocaine block	Pain well relieved by recumbency	Se 0.92 (0.67, 0.99); Sp 0.24 (0.12, 0.42)
						Pain not exacerbated by coughing	Se 1.00 (0.77, 1.00); Sp 0.35 (0.20, 0.53)
Scwharzer	1994	Secondary	N=176	Adult patients with LBP referred by neurosurgeons, orthopaedic surgeons, and physiatrists	Double diagnostic block	Left groin pain referral	Se 0.21 (0.09, 0.43); Sp 0.84 (0.78, 0.90)
						Right groin pain referral	Se 0.04 (0.01, 0.20); Sp 0.82 (0.75, 0.88)
						Left buttock pain referral	Se 0.17 (0.09, 0.28); Sp 0.85 (0.76, 0.90)
						Right buttock pain referral	Se 0.15 (0.08, 0.25); Sp 0.83 (0.74, 0.89)

						Left thigh pain referral	Se 0.17 (0.09, 0.28); Sp 0.84 (0.77, 0.90)
						Right thigh pain referral	Se 0.14 (0.08, 0.25); Sp 0.86 (0.79, 0.91)
						Left calf pain referral	Se 0.17 (0.09, 0.31); Sp ewq0.85 (0.77,0.89)
						Right calf pain referral	Se 0.08 (0.03, 0.17); Sp 0.81 (0.73, 0.87)
						Left foot pain referral	Se 0.26 (0.14, 0.43); Sp 0.86 (0.79, 0.91)
						Right foot pain referral	Se 0.07 (0.02, 0.21); Sp 0.82 (0.75, 0.88)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the anatomic structure thought to be involved	75% response on Lidocaine block	Relief with recumbency	Se 0.91 (0.72, 0.97); Sp 0.44 (0.25, 0.66)
						Pain not worse with cough	Se 0.82 (0.62, 0.93); Sp 0.50 (0.29, 0.71)
Diagnostic utility of patient history and physical examination data to detect spondylolysis and spondylolisthesis in athletes with low back pain: A systematic review (Grodahl, 2016)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Gregg	2009	Sports medicine clinic	N=71	All patients with LBP referred for a SPECT scan to confirm suspected diagnosis of spondylolysis	SPECT scan	Injured period < 3 months	Se 65.38; Sp 54.55
						Onset of symptoms (sudden)	Se 87.5; Sp 50.91
						Sports participation (yes)	Se 84.62; Sp 33.93
Kalpakcioglu	2009	Hospital setting	N=130	Patients with LBP and radiological diagnosis of spondylolisthesis	Antero-posterior, lateral, oblique and lateral flexion/extension	Pain localised to the low back	Se 23; Sp 76.67
						Sciatica	Se 61; Sp 26.67

					radiograph flexion	Pain in the gluteal region or backside of the femur	Se 16; Sp 96.67
Diagnostic performance of clinical tests for sacroiliac joint pain (Sivayogam, 2011)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Dreyfuss	1996	Tertiary	N=85	Patients ≥ 18 years with non-specific, non-pregnancy related low back pain and/or buttock pain, with or without lower extremity symptoms	SIJB {with 1.5 ml lidocaine 2% and 0.5 ml corticosteroids; 90% pain relief on VAS)	Pain over SIJ	Se 0.85; Sp 0.08; +LR 0.9; -LR 1.87
						Pain over groin	Se 0.19; Sp 0.63; +LR 0.5; -LR 1.28
						Buttock pain	Se 0.80; Sp 0.14; +LR 0.9; -LR 1.42
						Sitting position	Se 0.03; Sp 0.90; +LR 0.3; -LR 1.07
						PSIS pointing	Se 0.76; Sp 0.47; +LR 1.4; -LR 0.51
Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain (Hancock, 2007)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200	Patients presenting to private pain management centre, with chronic LBP +/- lower extremity pain	Double diagnostic block	Pain reduced with recumbency	Se 94 (86, 98); Sp 17 (10,25); +LR 1.1 (1.0,1.2); -LR 0.39 (0.18,0.96)
						Pain not increased with cough	Se 90 (82, 95); Sp 13 (8, 21); +LR 1.0 (0.9, 1.1); -LR 0.76 (0.34,1.66)
						Traumatic onset	Se 48 (37,59); Sp 50 (41, 59); +LR 1.0 (0.7, 1.3); -LR 1.05 (0.80–1.37)
Manchikanti	1999		N=120			Traumatic onset	Se 54 (40, 67); Sp 47 (35, 60); +LR 1.01 (0.7, 1.4); -LR 0.99 (0.67, 1.44)
Revel	1998	Tertiary	N=42		75% response on Lidocaine block	Pain reduced with recumbency	Se 89 (62, 99); Sp 25 (11, 44); +LR 1.2 (0.9, 1.6); -LR 0.43 (0.08–2.20)

				Patients with LBP >3/12 referred for facet injection		Pain not increased with cough	Se 96 (71, 100); Sp 35 (19, 55); +LR 1.5 (1.1, 2.0); -LR 0.10 (0.01,1.62)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the anatomic structure thought to be involved	75% response on Lidocaine block	Pain reduced with recumbency	Se 89 (69, 98); Sp 45 (22, 69); +LR 1.6 (1.1,2.5); -LR 0.24 (0.07, 0.87)
						Pain not increased with cough	Se 80 (59, 94); Sp 50 (27, 73); +LR 1.6 (1.0, 2.6); -LR 0.39 (0.15, 1.01)

Table S10: Diagnostic accuracy of physical examination findings for non-specific LBP

Low back pain of disc, sacroiliac joint, or facet joint origin: a diagnostic accuracy systematic review (Han, 2023)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				
Han	2023	Secondary and tertiary care	N = ranged from 15 to 736	Patients with low back pain without serious pathology such as cancer, infection, or fracture	Greater than or equal to 50% pain relief with double SIJ block	Gaenslen’s test	Se 47.9 (38.7, 57.2); Sp 47.9 (37.5, 58.4); LR+ 0.85 (0.56, 1.28); LR- 1.12 (0.77, 1.62)
						Sacral thrust test	Se 57.3 (45.9, 68.2); Sp 48.8 (37.9, 59.9); LR+ 1.13 (0.73, 1.75); LR- 0.87 (0.52, 1.44)
						Thigh thrust test	Se 54.1 (48.1, 60.1); Sp 53.7 (44.9, 62.3); LR+ 1.13 (0.83, 1.55); LR- 0.91 (0.67, 1.22)
						Compression test	Se 48.6 (31.9, 65.6); Sp 71.7 (56.5, 84.0); LR+ 1.79 (1.03, 3.11); LR- 0.74 (0.52, 1.05)
			n=62			Patrick’s test (FABER test)	Se 76.4 (70.2, 81.8); Sp 32.3 (23.3, 42.5); LR+ 1.05 (0.69, 1.60); LR- 0.86 (0.30, 2.48)
						Distraction test	Se 41.7 (25.5, 59.2); Sp 80.4 (66.1, 90.6); LR+ 2.18 (1.08, 4.38); LR- 0.73 (0.54, 0.99)
						Gillet’s test	Se 67.5 (56.4, 77.3); Sp 45.5 (31.2, 60.2); LR+ 1.01 (0.80, 1.28); LR- 1.08 (0.75, 1.55)
						Absence of midline LBP	Se 24.6 (14.1, 37.8); Sp 34.3 (27.2, 42.0); LR+ 2.41 (1.89, 3.07); LR- 0.35 (0.12, 1.01)
PRIMARY STUDIES							

First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Mekhail	2021	Tertiary	N=199	Patients with LBP evaluated by diagnostic SIJ injections	Greater than or equal to 50% pain relief with double SIJ block	Mekhail test	80.4 (73.3 to 86.3) 26.8 (14.2 to 42.9) 1.10 (0.90 to 1.34) 0.73 (0.40 to 1.33)
						Patrick test	81.6 (74.7 to 87.3) 43.9 (28.5 to 60.3) 1.46 (1.10 to 1.93) 0.42 (0.26 to 0.67)
						Thigh thrust test	53.2 (45.1 to 61.1) 48.8 (32.9 to 64.9) 1.04 (0.74 to 1.45) 0.96 (0.67 to 1.37)
						Mekhail/Patrick test	94.3 (89.5 to 97.4) 17.1 (7.2 to 32.1) 1.14 (0.99 to 1.31) 0.34 (0.13 to 0.84)
						Mekhail/thigh thrust test	89.9 (84.1 to 94.1) 14.6 (5.6 to 29.2) 1.05 (0.92 to 1.21) 0.69 (0.29 to 1.66)
						Patrick/thigh thrust test	89.2 (83.3 to 93.6) 29.3 (16.1 to 45.5) 1.26 (1.03 to 1.55) 0.37 (0.19 to 0.71)
Nejati	2020	Secondary	N=48	Patients with LBP evaluated by diagnostic SIJ injections	Greater than or equal to 50% pain relief with double SIJ block	FABER test	Se 71.8 (55.1, 85.0); Sp 66.7 (29.9, 92.5); LR+ 2.15 (0.84, 5.54); LR- 0.42 (0.21, 0.84)
						Thigh thrust test	Se 74.4 (57.9, 87.0); Sp 44.4 (13.7, 78.8); LR+ 1.34 (0.73, 2.47); LR- 0.58 (0.23, 1.43)
						Gaenslen test	Se 38.5 (23.4, 55.4); Sp 33.3 (7.5, 70.1); LR+ 0.58 (0.31, 1.06); LR- 1.85 (0.71, 4.81)
						Yeoman test	Se 64.1 (47.2, 78.8); Sp 33.3 (7.5, 70.1); LR+ 0.96 (0.57, 1.61); LR- 1.08 (0.39, 2.97)

						Gillet test	Se 98.7 (88.8, 100.00); Sp 5.3 (0.0, 39.7); LR+ 1.04 (0.89, 1.22) LR- 0.24 (0.01, 11.36)
						Forward flexion test	Se 98.7 (88.8, 100.00); Sp 5.3 (0.0, 39.7); LR+ 1.04 (0.89, 1.22) LR- 0.24 (0.01, 11.36)
Lewinnek	1986	NA	N=21	Patients with LBP	Greater than or equal to 80% pain relief with double blocks	Pain on extension (for pain originating from the facet joint)	Se 73.3 (44.9, 92.2); Sp 80.0 (28.4, 99.5); LR+ 3.67 (0.62, 21.73); LR- 0.33 (0.13, 0.86)
						SLR (pain originating from the facet joint)	Se 66.7 (22.3, 95.7); Sp 76.9 (46.2, 95.0); LR+ 2.89 (0.92, 9.06); LR- 0.43 (0.13, 1.40)
Reliability and validity of manual palpation for the assessment of patients with low back pain: a systematic and critical review (Nolet, 2021)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Adelmanesh	2016	NA	N=777	Adult patients with LBP with or without radiculopathy of any duration	Multidisciplinary panel of experts based on examination of clinical evaluations, MRI, and if needed, electrodiagnostic testing	Palpation of the superior-lateral quadrant of the gluteal muscle to identify GTrP representing the combination of tenderness, taut band and pain	Se 74.1 (67.7, 80.3); Sp 91.4 (86.8, 96); +LR 8.6; -LR 0.28; PPV 91.9 (87.6, 96.3); NPV 72.7 (66.1, 79.3); ROC curve 0.827 (0.781, 0.874)
Koppenhaver	2014	NA	N=51	Adult patients with chronic LBP, with modified ODI ≥20/100	Spinal stiffness was quantified using a mechanized indentation device.	Palpation of spinal stiffness: the spinous processes of L1-L5 palpated with the subject lying prone	Se 0.45 (0.28, 0.62); Sp 0.38 (0.21, 0.59); +LR 0.69 (0.37, 1.31); -LR 1.38 (0.82, 2.33)

**Evidence and recommendations for the use of segmental motion testing for patients with LBP - A systematic review
(Stolz, 2020)**

PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Fritz	2005	Tertiary	N=49	Adult patients with a chief complaint of LBP of any duration	F/E radiographs	PAIVMs	Hypomobility: Se 0.43 (0.27, 0.61); Sp 0.95 (0.77, 0.99); LR+: 9.00 (1.3, 63.9); LR-: 0.60 (0.43, 0.84) Hypermobility: Se 0.46 (0.30, 0.64); Sp 0.81 (0.60, 0.92); LR+: 2.42 (0.93, 6.4) LR- 0.66 (0.44, 0.99)
Abbot	2005	Physical therapy clinics	N=123	Patients with a new episode of LBP or history of LBP at least three months before recruitment	F/E radiographs	PAIVMs	Rotation LSI (by segment): Se 0.17 (0.03, 0.56); Sp 0.95 (0.92, 0.96); LR+: 3.10 (0.50, 19.39); LR- : 0.88 (0.62, 1.26); Translation LSI (by segment): Se 0.19 (0.07, 0.43); Sp 0.95 (0.92, 0.97); LR 3.73 (1.24, 11.23); LR- 0.86 (0.68, 1.08)
						Flex PPIVMs	Rotation LSI (by segment): Se 0.07 (0.01, 0.44); Sp 0.99 (0.98, 1.00); LR+ 12.71 (0.67, 241.27); LR- 0.93 (0.76, 1.15); Translation LSI (by segment): Se 0.03 (0.00, 0.22); Sp 0.99 (0.92, 1.00); LR+ 4.82 (0.24, 96.82); LR- 0.98 (0.90, 1.06)
						Ext PPVMs	Rotation LSI (by segment) Se 0.07 (0.01, 0.44); Sp 0.99 (0.97, 1.00); LR+ 6.75 (0.39, 110.76); LR- 0.94 (0.76, 1.15); Translation LSI (by segment): Se 0.03 (0.00, 0.25); Sp 1.00 (1.00, 1.00); LR+ 26.8 (0.55, 1305.5); LR- 0.97 (0.88, 1.06)
Philips and Twoney	1996	NA	N=63	NA	Spinal anaesthetic block	PAIVMs and PPIVMs	Se 0.53; Sp 0.80

**Systematic review of patient history and physical examination to diagnose chronic low back pain originating from the facet joints
(Maas, 2017)**

PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2006	Secondary	N=120	Adult patients, of either gender, suffering from CLBP	ZJ block 75% reduction standard	Extension rotation test	Se 0.86 (0.69, 0.94); Sp 0.22 (0.14, 0.32)
					ZJ block 80% reduction standard		Se 0.87 (0.69,0.96); Sp 0.22 (0.14, 0.32)
					ZJ block 85% reduction standard		Se 0.91 (0.72, 0.97); Sp 0.22 (0.15, 0.31)
					ZJ block 90% reduction standard		Se 0.94 (0.72, 0.99); Sp 0.22 (0.15, 0.31)
					ZJ block 95% reduction standard		Se 1.00 (0.76,1.00); Sp 0.22 (0.15, 0.31)
					ZJ block 95% reduction standard	Absence of centralization phenomenon	Se 1.00 (0.74., 1.00); Sp 0.17 (0.11., 0.27)
Gonzales	2004	Pain clinic	N=150	Adult patients with lumbar zygapophysial joint pain	Double diagnostic blocks (corresponding facet joints, combination of local anesthetic and corticosteroid)	Lumbar facet sign	Se 0.95 (0.84, 0.99); Sp unable to estimate
Young	2003	Secondary (Private radiology practice)	N=81	Adult patients with chronic lumbar or lumbopelvic pain who were referred to a private radiology practice	≥80% pain relief after lumbar zygapophysial joint injection	Centralization	Se 0.00 (0.00, 0.22); Sp 0.89 (0.56, 0.98)
						Non-centralization	Se 1.00 (0.78, 1.00); Sp 0.11 (0.02, 0.44)
Manchikanti	2000	Secondary (One private pain management)	N=200	Patients presenting to private pain management centre,	Double diagnostic block	Pain not exacerbated by forward flexion	Se 0.15 (0.09,0.25); Sp 0.82 (0.74, 0.88)

		practice, in a non- university setting)		with chronic LBP +/- lower extremity pain		Pain not exacerbated by deflexion	Se 0.55 (0.44,0.65); Sp 0.48 (0.39, 0.57)
						Pain not exacerbated by hyperextension	Se 0.10 (0.05,0.18); Sp 0.86 (0.79, 0.91)
						Pain not exacerbated by extension/rotation	Se 0.68 (0.57,0.77); Sp 0.30 (0.23, 0.39)
						Pain with flexion	Se 0.85 (0.75, 0.91); Sp 0.18 (0.12, 0.26)
						Pain with deflexion	Se 0.57 (0.46, 0.67); Sp 0.46 (0.37, 0.55)
						Pain with extension	Se 0.88 (0.79, 0.93); Sp 0.14 (0.09, 0.21)
						Pain with lateral rotation	Se 0.68 (0.57, 0.77); Sp 0.30 (0.23, 0.39)
						Pain with sitting and bending	Se 0.49 (0.38, 0.59); Sp 0.56 (0.47, 0.65)
						Normal gait	Se 0.98 (0.92, 0.99); Sp 0.10 (0.06, 0.17)
						Muscle spasm	Se 0.48 (0.37, 0.58); Sp 0.46 (0.37, 0.55)
						Paravertebral tenderness	Se 0.93 (0.85, 0.97); Sp 0.13 (0.08, 0.20)
						Pain increased by cough/valsava	Se 0.14 (0.08, 0.23); Sp 0.86 (0.79, 0.91)
						Back pain with SLR	Se 0.49 (0.39, 0.60); Sp 0.37 (0.29, 0.46)
						Negative neurological exam	Se 0.91 (0.83, 0.95); Sp 0.25 (0.18, 0.34)

Revel	1998	Tertiary	N=80	Adult patients with lumbar zygapophysial joint pain	75% response on Lidocaine block	Pain not exacerbated by forward flexion	Se 1.00 (0.77, 1.00); Sp 0.48 (0.31, 0.66)
						Pain not exacerbated by rising from flexion	Se 1.00 (0.77, 1.00); Sp 0.59 (0.41, 0.74)
						Pain not exacerbated by hyperextension	Se 0.92 (0.67,0.98); Sp 0.62 (0.44, 0.77)
						Pain not exacerbated by extension/rotation	Se 0.76 (0.50, 0.92); Sp 0.48 (0.31, 0.66)
Scwharzer	1994	Secondary	N=176	Adult patients with LBP referred by neurosurgeons, orthopaedic surgeons, and physiatrists	Double diagnostic block	Absence of pain on combined rotation and extension	Se 0.18 (0.12, 0.25); Sp 1.0 (0.81, 1.0)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the anatomic structure thought to be involved	75% response on Lidocaine block	Pain not worse with forward flexion	Se 0.64 (0.43, 0.80); Sp 0.78 (0.55, 0.91)
						Pain not worse with raising from forward flexion	Se 0.77 (0.57, 0.90); Sp 0.56 (0.34, 0.75)
						Pain not worse with hyperextension	Se 0.55 (0.35,0.73); Sp 0.72 (0.49, 0.88)
						Pain not worse with extension/rotation	Se 0.68 (0.47, 0.84); Sp 0.78 (0.55, 0.91)

**Diagnostic utility of patient history and physical examination data to detect spondylolysis and spondylolisthesis in athletes with low back pain: A systematic review
(Grodahl, 2016)**

PRIMARY STUDIES

First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Anh and Juhn	2015	Pain management clinic	N=86	Patients with LBP/lumbar radicular pain	Lumbar lateral radiography	Step deformity (palpation)	Se 81.3; Sp 89.1; +LR 7.43; -LR 0.21
Ferrari	2014	Pain management clinic	N=119	Patients with LBP with/without referred pain and a diagnosis of spondylolisthesis	Radiographs, MRI or CT	ASLR	Se 64; Sp 45; +LR 1.16; -LR 0.80
						Prone instability test	Se 44; Sp 45; +LR 0.80; -LR 1.24
						Passive lumbar extension	Se 43; Sp 86; +LR 3.07; -LR 0.66
						Abberant movement	Se 41; Sp 77; +LR 1.78; -LR 0.76
Sundell	2013	Physiotherapy clinic	N=25	Patients practicing 6 h of sports/week and >3 weeks of LBP, hindering their ADL or physical activity, with suspected spondylolysis	MRI and CT	OLHET	Se 61.54; Sp 0; +LR 0.62
						Prone back extension with fixed pelvis test	Se 46.15; Sp 33.33; +LR 0.69; -LR 1.62
						Coin test	Se 84.62; Sp 16.67; +LR 1.02; -LR 0.92
						Percussion test with reflex hammer	Se 38.76; Sp 50; +LR 0.77; -LR 1.12
						Rocking test	Se 69.23; Sp 25; +LR 0.92; -LR 1.23
						Sacrum nutation test	Se 23; Sp 58.33; +LR 0.55; -LR 1.32
						HOOK test	Se 46.15; Sp 75; +LR 1.85; -LR 0.72
						MCI control test	Se 69.23; Sp 50; +LR 1.38; -LR 0.62
Gregg	2009	Sports medicine clinic	N=71	All patients with LBP referred for a SPECT scan to confirm	SPECT scan	OLHET	Se 73; Sp 17.2

				suspected diagnosis of spondylolysis			
Kalpakcioglu	2009	Hospital setting	N=130	Patients with LBP and radiological diagnosis of spondylolisthesis	Antero-posterior, lateral, oblique and lateral flexion/extension radiograph flexion	Gait disorder	Se 5; Sp 93.33; +LR 0.75; -LR 1.02
						Weak/ dropping abdominal wall	Se 99; Sp 40; +LR 1.65; -LR 0.03
						Paravertebral muscles hypertrophy	Se 65; Sp 70; +LR 2.17; -LR 0.50
						Paravertebral muscles spasm	Se 87; Sp 13.33; +LR 1.0; -LR 0.98
						Increase in lumbar lordosis	Se 58; Sp 63; +LR 1.58; -LR 0.66
						Signs of slipping (inspection)	Se 21; Sp 100; -LR 0.29
						Step deformity (palpation)	Se 88; Sp 100; -LR 0.12
						Hamstring muscle spasm	Se 27; Sp 96.67; +LR 8.10; -LR 0.76;
						Contracting hamstring muscle	Se 1; Sp 90; +LR 0.10; -LR 1.10
						Z posture	Se 2; Sp 100; -LR 1.10
						Lumbar flexion	Se 19; Sp 3.33; +LR 0.20; -LR 24.3
						Lumbar extension	Se 79; Sp 66.67; +LR 2.37; -LR 0.31
						Lumbar lateral flexion	Se 46; Sp 83.33; +LR 2.76; -LR 0.65
						Lumbar rotation	Se 10; Sp 96.67; +LR 3; -LR 0.93
						SLR	Se 10; Sp 90; +LR 1; -LR 1
						ASLR	Se 87; Sp 76.67; 3.73; -LR 0.17
						Femoral stretch test	Se 14; Sp 96.67; +LR 4.20; -LR 0.89
						Achilles reflex	Se 13; Sp 93.33; +LR 2.40; -LR 0.95
						Patellar reflex	Se 8; Sp 96.67; +LR 0.30; -LR 1.02

						Loss of strength	Se 1; Sp 96.67; +LR 0.3; -LR 1.02
						Sensorial change	Se 2; Sp 100; -LR 0.98
						Walking distance < 250 m	Se 74; Sp 60; +LR 1.85; -LR 0.43
Masci	2006	Sports medicine clinic	N=82	Patients engaged in regular activity, symptoms of LBP <6 months, provisional diagnosis of active spondylolysis	Bone scintigraphy with SPECT/CT	OLHET	Left leg: Se 50, Sp 32.4; +LR 0.74; -LR 1.54; Right leg: Se 55; Sp 45.4; +LR 1.01; -LR 0.98
Collaer	2006	Hospital/Sports medicine clinic	N=30	Patients with LBP and/or radiculopathy	Lumbar lateral radiography	Step deformity (palpation)	Se 60; Sp 87; +LR 4.68; -LR 0.46
Möller	2000	Hospital setting	N=111	Patients with lumbar isthmic spondylolisthesis of all grades with at least 1 year of low back pain or sciatica and severely restricted functional ability	Radiographs	EHL-reduced power	Se 6.31; +LR 0.06
						SLR	Se 11.71; +LR 0.12
						Femoral stretch test	Se 1.80; +LR 0.02
						Lateral flexion	Se 42.34; +LR 0.42
						Hamstring tightness	Se 20.72; +LR 0.21
						Achilles reflex	Se 5.41; +LR 0.05
						Patellar reflex	Se 4.50; +LR 0.05
						Sensorial change	Se 23.42; +LR 0.43
						Lumbosacral tenderness	Se 66.67; +LR 0.67
A literature review of clinical tests for lumbar instability in low back pain: validity and applicability in clinical practice (Ferrari, 2015)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Fritz	2005	Tertiary	N=38	Patients with LBP with or without buttock or leg pain	Dynamic X-Ray (Flexion/extension)	Aberrant movement pattern: Painful arc on flexion;	Se 0.18 (0.08, 0.36); Sp 0.95 (0.77, 0.99); +LR 3.75 (0.47, 29.75); -LR (0.71, 1.05)

[illegible]

(Alqarni, 2011)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Kasai	2006	NA	N=122	Patients with lumbar degenerative diseases (89 lumbar spinal canal stenosis; 21 lumbar spondylolisthesis; 12 lumbar degenerative scoliosis)	Dynamic x-ray: flexion-extension films of the lumbar spine, lateral vision.	Painful catch sign	Se 37 (22, 54); Sp 73 (62, 82); +LR 1.4 (0.8, 2.3); -LR 0.9 (0.7, 1.1)
						Apprehension sign	Se 18 (8, 35); Sp 88 (79,94); +LR 1.6 (0.6, 3.8); -LR 0.9 (0.8, 1.1)
Maigne	2003	Tertiary	N=42	Patients with chronic LBP	Radiographic diagnosis of translational LSI (flexion-extension radiographs)	Sit-to-stand test (pain upon sitting down and relieved by standing up)	Se 31 (10, 61); Sp 100 (85, 100); -LR 0.7 (0.5, 1.0)
Diagnostic performance of clinical tests for sacroiliac joint pain (Sivayogam, 2011)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2005	Secondary	N=48	Patients with buttock pain, with or without lumbar or lower extremity symptoms	Double SIJB with 1.5 ml lidocaine and bupivacaine; pain provocation followed by 80% pain relief on NRS1	Distraction	Se 0.60 (0.36, 0.80); Sp 0.81 (0.65, 0.91); +LR 3.20; -LR 0.49
						Compression	Se 0.69 (0.44, 0.86); Sp 0.69 (0.51); +LR 2.20; -LR 0.46
						Thigh thrust	Se 0.88 (0.64, 0.97); Sp 0.69 (0.82); +LR 2.80; -LR 0.18
						Gaenslen's right	Se 0.53 (0.30, 0.75); Sp 0.71 (0.53, 0.84); +LR 1.84; -LR 0.66
						Gaenslen's left	Se 0.50 (0.27,0.73); Sp 0.77 (0.60, 0.89); +LR 2.21; -LR 0.65

						Sacral thrust	Se 0.63 (0.39, 0.82); Sp 0.75 (0.58, 0.87); +LR 2.50; -LR 0.50
Broadhurst and Bond	1998	NA	N=40	NA	SIJB with 4 ml lidocaine 1% or 0.9% NaCl; 70% pain relief on VAS	Patrick's sign	Se 0.77; Sp 1.00
						Thigh thrust	Se 0.80; Sp 1.00
						Resisted abduction	Se 0.87; Sp 1.00
Dreyfuss	1996	Tertiary	N=85	Patients ≥ 18 years with non-specific, non-pregnancy related low back pain and/or buttock pain, with or without lower extremity symptoms	SIJB {with 1.5 ml lidocaine 2% and 0.5 ml corticosteroids; 90% pain relief on VAS)	Gillet test	Se 0.43; Sp 0.68; +LR 1.3; -LR 0.83
						Thigh thrust	Se 0.36; Sp 0.50; +LR 0.7; -LR 1.28
						Patrick's sign	Se 0.69; Sp 0.16; +LR 0.8; -LR 1.93
						Gaenslen's test	Se 0.71; Sp 0.26; +LR 1.0; -LR 1.11
						Sacral thrust	Se 0.53; Sp 0.29; +LR 0.8; -LR 1.62
						Sacral spring	Se 0.75; Sp 0.35; +LR 1.2; -LR 0.71
						Sacral sulcus	Se 0.95; Sp 0.09; +LR 1.0; -LR 0.55
Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain (Hancock, 2007)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2006	Secondary	N=120	Adult patients, of either gender, suffering from CLBP	NA	No centralisation	Se 96 (65, 100); Sp 16 (8, 28); +LR 1.1 (1.0, 1.4); -LR 0.28 (0.02, 4.43)
Laslett	2005	Secondary	N=48	Patients with buttock pain, with or without lumbar or lower extremity symptoms	Double SIJB with 1.5 ml lidocaine and bupivacaine; pain provocation followed by 80% pain relief on NRS1	Thigh thrust	Se 69 (45, 87); Sp 64 (44,81); +LR 1.9 (1.1,3.3); -LR 0.49 (0.24,0.97)
						Sacral thrust	Se 51 (36,66); Sp 40 (25, 57); +LR 0.9 (0.6, 1.2); -LR 1.22 (0.76, 1.96)
Young	2003	Secondary (Private radiology practice)	N=81	Adult patients with chronic lumbar or lumbopelvic pain who were referred to a private radiology practice	≥80% pain relief after lumbar zygapophysial joint injection	No centralisation	Se 97 (73, 100); Sp 15 (1, 50); +LR 1.1 (0.9, 1.5); -LR 0.22 (0.01, 4.93)

Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200	Patients presenting to private pain management centre, with chronic LBP +/- lower extremity pain	Double diagnostic block	Pain not increased with forward flexion	Se 16 (9,25); Sp 82 (73, 88); +LR 0.9 (0.5,1.6); -LR 1.03 (0.91,1.17)
						Pain not increased with rising from flexion	Se 55 (44,65); Sp 48 (39, 58); +LR 1.1 (0.8,1.4); -LR 0.94 (0.70, 1.26)
						Pain not increased with hyperextension	Se 10 (5,18); Sp 86 (78,92); +LR 0.7 (0.3,1.5); +LR 1.05 (0.95,1.16)
						Pain not increased with extension / rotation	Se 68 (57,77); Sp 30 (22, 40); +LR 1.0 (0.8, 1.2); -LR 1.07 (0.71, 1.61)
Revel	1998	Tertiary	N=42	Patients with LBP >3/12 referred for facet injection	75% response on Lidocaine block	Pain not increased with forward flexion	Se 89 (62, 99); Sp 25 (11, 44); +LR 1.2 (0.9, 1.6); -LR 0.43 (0.08–2.20)
						Pain not increased with rising from flexion	Se 96 (71, 100); Sp 35 (19, 55); +LR 1.5 (1.1,2.0); -LR 0.10 (0.01–1.62)
						Pain not increased with hyperextension	Se 96 (71, 100); Sp 48 (30, 67); +LR 1.9 (1.3, 2.7); -LR 0.07 (0.01, 1.15)
						Pain not increased with extension / rotation	Se 96 (71, 100); Sp 58 (39, 76); +LR 2.3 (1.5, 3.6); -LR 0.06 (0.00, 0.97)
Dreyfuss	1996	Tertiary	N=85	Patients ≥ 18 years with non-specific, non-pregnancy related low back pain and/or buttock pain, with or without lower extremity symptoms	SIJB {with 1.5 ml lidocaine 2% and 0.5 ml corticosteroids; 90% pain relief on VAS)	Sacral thrust	Se 51 (36, 66); Sp 40 (25,57), +LR 0.9 (0.6, 1.2); -LR 1.22 (0.76, 1.96)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the	75% response on Lidocaine block	Pain not increased with forward flexion	Se 63 (41, 82); Sp 76 (52, 92); +LR 2.7 (1.1, 6.3); -LR 0.48 (0.27, 0.87)

				anatomic structure thought to be involved		Pain not increased with rising from flexion	Se 76 (54, 91); Sp 55 (31, 78); +LR 1.7 (1.0, 2.9); -LR 0.43 (0.19, 1.00)
						Pain not increased with hyperextension	Se 54 (33, 75); Sp 71 (46, 89); +LR 1.9 (0.8, 4.2); -LR 0.64 (0.38, 1.09)
						Pain not increased with extension / rotation	Se 68 (45, 85); Sp 76 (52, 92); +LR 2.8 (1.2, 6.7); -LR 0.43 (0.23, 0.81)
Accuracy of spinal orthopaedic tests: a systematic review (Simpson, 2006)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2003	Tertiary	N=48	Patients with buttock pain, with or without lumbar or lower extremity symptoms, referred to a private radiology practice	SIJB	SI Compression	Se 91; Sp 83
						SI Distraction	Se 92; Sp 83
						Thigh trust	Se 93; Sp 83
						Gaenslen	Se 94; Sp 83
						Sacral Thrust	Se 95; Sp 83
Leboeuf	1990	Primary	N=68	Patient with lumbosacral pain attending a chiropractic clinic	NA	Fabere	Se 10; Sp 86
						SI Aggravation	Se 20; Sp 59
						Ely	Se 44; Sp 83
						Yoeman	Se 46; Sp 72
						Sacral Base Spring	Se 33; Sp 59

Table S11: Diagnostic accuracy of clinical diagnostic support tools for the diagnosis of non-specific LBP

Low back pain of disc, sacroiliac joint, or facet joint origin: a diagnostic accuracy systematic review (Han, 2023)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N) Number of studies (n)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
Han	2023	Secondary and tertiary care	N = ranged from 15 to 736 n=62	Patients with low back pain without serious pathology such as cancer, infection, or fracture	Greater than or equal to 50% pain relief with double SIJ block	3 or more positive SIJ pain provocation test	Se 80.5 (72.0, 87.4); Sp 68.1 (60.4, 75.2); LR+ 2.44 (1.50, 3.98); LR- 0.31 (0.21, 0.47)
Systematic review of patient history and physical examination to diagnose chronic low back pain originating from the facet joints (Maas, 2017)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Laslett	2006	Secondary	N=120	Adult patients, of either gender, suffering from CLBP	ZJ block 95% reduction standard	Clinical prediction rule (CPR) 1	Se 1.00 (0.70, 1.00); Sp 0.87 (0.70, 0.93)
						Clinical prediction rule (CPR) 2	Se 1.00 (0.76, 1.00); Sp 0.36 (0.27, 0.45)
						Clinical prediction rule (CPR) 3	Se 1.00 (0.76,1.00); Sp 0.26 (0.19, 0.35)
						Clinical prediction rule (CPR) 4	Se 1.00 (0.76, 1.00); Sp 0.50 (0.41, 0.60)
						Clinical prediction rule (CPR) 5	Se 0.85 (0.58,0.96); Sp 0.91 (0.84, 0.95)
Laslett	2004	Secondary	N=151	Patients with low back pain with or without lower extremity	ZJ block 75% reduction standard	Revel's criteria	Se 0.11 (0.02, 0.29); Sp 0.91 (0.83, 0.96)

				symptoms, referred to a private radiology practice	ZI block 100% reduction standard	Revel's criteria.	Se 0.06 (0.01, 0.28); Sp 0.93 (0.86, 0.97)
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200	Patients presenting to private pain management centre, with chronic LBP +/- lower extremity pain	Double diagnostic block	Revel's criteria	Se 0.13 (0.07, 0.22); Sp 0.84 (0.76, 0.90)
						> 3 inappropriate symptoms	Se 0.24 (0.16, 0.34); Sp 0.68 (0.59, 0.76)
						> 3 inappropriate signs	Se 0.54 (0.43, 0.64); Sp 0.59 (0.49, 0.67)
Revel	1998	Tertiary	N=80	Patients with LBP >3/12 referred for facet injection	75% response on Lidocaine block	5 of 7 characteristics	Se 1.00 (0.75,1.00); Sp 0.66 (0.46, 0.82)
						5 of 7 characteristics including relieved by recumbancy	Se 0.92 (0.67, 0.99); Sp 0.79 (0.62, 0.91)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the anatomic structure thought to be involved	75% response on Lidocaine block	6 of 7 variables	Se 0.45 (0.27, 0.65); Sp 1.00 (0.82, 1.00)
						5 of 7 variables	Se 0.64 (0.41, 0.83); Sp 0.89 (0.65, 0.99)
						4 of 7 variables	Se 0.82 (0.61, 0.93); Sp 0.78 (0.55, 0.91)
Diagnostic performance of clinical tests for sacroiliac joint pain (Sivayogam, 2011)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Stanford and Burnhan	2010	NA	N=34	Patients with LBP that was refractory to non-invasive conservative spine treatment for >6/12	Pre-block (SIJB with 1.5 ml lidocaine 2% and bupivacaine 0.25%; 80% index pain relief)	Composites of distraction, thigh trust, Gaenslen's test, compression and sacral thrust (3 or more positive tests)	Se 0.82 (0.58, 0.95); Sp 0.57 (0.45, 0.63); +LR 1.9; -LR 0.31

					Post-block (normalization)		Se 0.89 (0.71, 0.98); Sp 0.57 (0.45, 0.63); +LR 1.3; -LR 0.36
Van der Wurff	2006	Tertiary	N=140	Patients referred for SIJ blocks, with pain principally below L5	Double SIJB with 2 ml lidocaine 2% or bupivacaine 0.25%; 50% pain relief on VAS	One or more positive tests	Se 1.00 (1.00, 1.00); Sp 42.4 (25.5, 60.8); +LR 1.74; -LR 0.00
						Two or more positive tests	Se 0.93 (0.76, 0.99); Sp 0.58 (0.39, 0.75); +LR 2.18; -LR 0.13
						Three or more positive tests	Se 0.85 (0.72, 0.99); Sp 0.79 (0.65, 0.93); +LR 4.02; -LR 0.19
						Four or more positive tests	Se 0.30 (0.11, 0.46); Sp 0.82 (0.64, 0.93); +LR 1.43; -LR 0.91
						Five or more positive tests	Se 0.00 (0.00, 0.00); Sp 1.00 (1.00, 1.00); +LR 0.00; -LR 1.00
Laslett	2005	Secondary	N=48	Patients with buttock pain, with or without lumbar or lower extremity symptoms	Double SIJB with 1.5 ml lidocaine and bupivacaine; pain provocation followed by 80% pain relief on NRS	One or more positive tests	Se 1.00 (0.81, 1.00); Sp 0.44 (0.28, 0.61); +LR 1.78; -LR 0.00
						Two or more positive tests	Se 0.93 (0.72, 0.99); Sp 0.66 (0.48, 0.80); +LR 2.73; -LR 0.10
						Three or more positive tests	Se 0.94 (0.72, 0.99); Sp 0.78 (0.61, 0.89); +LR 4.29; -LR 0.80
						Four or more positive tests	Se 0.60 (0.36, 0.80); Sp 0.81 (0.65, 0.91); +LR 3.20; -LR 0.49
						Five or more positive tests	Se 0.27 (0.11, 0.52); Sp 0.88 (0.72, 0.95); +LR 2.13; -LR 0.84
						Two positive tests of distraction, thigh thrust, compression, and sacral thrust	Se 0.88 (0.64, 0.97); Sp 0.78 (0.61, 0.89); +LR 4.00; -LR 0.16
Laslett	2003	Tertiary	N=48	Patients with buttock pain, with or		Three or more positive tests	Se 0.91 (0.62, 0.98); Sp 0.78 (0.61, 0.89); +LR 4.16; -LR 0.12

				without lumbar or lower extremity symptoms, referred to a private radiology practice		Three or more positive tests in the absence of centralization during repeated movement test	Se 0.91 (0.62, 0.98); Sp 0.87 (0.68, 0.96); +LR 6.97; -LR 0.10
Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain (Hancock, 2007)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants	Population	Reference standard	Index test	Diagnostic accuracy data
Van der Wurff	2006	Tertiary	N=140	Patients referred for SIJ blocks, with pain principally below L5	Double SIJB with 2 ml lidocaine 2% or bupivacaine 0.25%; 50% pain relief on VAS	3 of more positive pain provocation procedures	Se 84 (65, 95); Sp 78 (60, 90); +LR 3.8 (2.0, 7.3); -LR 0.21 (0.09, 0.49)
Laslett	2005	Secondary	N=48	Patients with buttock pain, with or without lumbar or lower extremity symptoms	Double SIJB with 1.5 ml lidocaine and bupivacaine; pain provocation followed by 80% pain relief on NRS	3 of more positive pain provocation procedures	Se 74 (50, 90); Sp 74 (55, 89); +LR 2.9 (1.5, 5.6); -LR 0.35 (0.17, 0.75)
Laslett	2004	Secondary	N=151	Patients with low back pain with or without lower extremity symptoms, referred to a private radiology practice	ZJ blocks	Revel's criteria	Se 18 (5, 43); Sp 93 (86,97); +LR 2.6 (0.8, 8.6); -LR 0.88 (0.70, 1.10)
Laslett	2003	Tertiary (Private radiology practice)	N=81	Adult patients with chronic lumbar or lumbopelvic pain who were referred to a private radiology practice	≥80% pain relief after lumbar zygapophysial joint injection	3 of more positive pain provocation procedures	Se 89 (59,99); Sp 80 (62, 92); +LR 4.4 (2.1, 8.9); -LR 0.15 (0.03, 0.66)

Young	2003	Secondary (Private radiology practice)	N=81	Adult patients with chronic lumbar or lumbopelvic pain who were referred to a private radiology practice	≥80% pain relief after lumbar zygapophysial joint injection	3 of more positive pain provocation procedures	Se 76 (56, 90); Sp 69 (50, 85); +LR 2.5 (1.4, 4.4); -LR 0.35 (0.17, 0.71)
Manchikanti	2000	Secondary (One private pain management practice, in a non- university setting)	N=200	Patients presenting to private pain management centre, with chronic LBP +/- lower extremity pain	Double diagnostic block	Revel's criteria	Se 13 (7, 22); Sp 84 (76, 90); +LR 0.8 (0.4, 1.7); -LR 1.03 (0.92, 1.16)
Revel	1998	Tertiary	N=42	Patients with LBP >3/12 referred for facet injection	75% response on Lidocaine block	Revel's criteria	Se 96 (71, 100); Sp 65 (46, 81); +LR 2.8 (1.7, 4.5); -LR 0.06 (0.00,0.85)
Revel	1992	NA	N=40	Patients suffering from LBP whatever the anatomic structure thought to be involved	75% response on Lidocaine block	Revel's criteria	Se 63 (41, 82); Sp 87 (64, 98); +LR 4.8 (1.4, 15.9); -LR 0.43 (0.24, 0.75)

Table S12: Diagnostic accuracy of demographics for the diagnostic of cauda equina syndrome

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Van Den Bosch	2004	Primary	N=2007	Patients referred with low back pain for lumbar spine radiography	Lumbar radiographs	Age 55 or more	+LR 1.5-8

Table S13: Diagnostic accuracy of demographics for the diagnostic of spinal fracture

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Age > 50	Se 0.74; Sp 0.33; +LR 1.1 (1.05-1.16); -LR 0.79 (0.69-0.91)
						Age > 70	Se 0.39; Sp 0.80; +LR 1.55 (1.36-1.76); -LR 0.86 (0.82-0.91)
Enthoven	2016	Primary	N=669	Patients with back pain consulting their GP	Lumbar radiographs	Age > 75	Se 0.45 (0.28-0.62); Sp 0.85(0.82-0.88); +LR 3.1 (2.0-4.7); -LR 0.6 (0.5-0.9)
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal alignment, vertebral body compression and	Age>50	Se 0.95 (0.83-0.95); Sp 0.39 (0.38-0.40); +LR 1.5 (1.3-1.5); -LR 0.14 (0.03-0.45)
						Body mass index < 22	Se 0.38 (0.24, 0.55); 0.83 (0.82, 0.84); +LR 2.3 (1.4, 3.4); -LR 0.74 (0.54, 0.91)

					spinal canal dimensions	Female gender	Se 0.90 (0.76, 0.96); 0.41 (0.41, 0.42); +LR 1.5 (1.3, 1.6); -LR 0.26 (0.10, 0.60)
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Age > 70	Se 0.50; Sp 0.96; +LR 11.0 (4.65, 19.48); -LR 0.52 (0.23,0.82)
Van Den Bosch	2004	Primary	N=2007	Patients referred with low back pain for lumbar spine radiography	Lumbar radiographs	Age 55 or more	+LR 1.5-8
Red flags to screen for vertebral fracture in patients presenting with low-back pain (Williams, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal alignment, vertebral body compression and spinal canal dimensions	Age > 52 years	Se 0.95 (0.82, 0.99); Sp 0.39 (0.36, 0.41); LR + 1.52 (1.42, 1.68); LR - 0.14 (0.04, 0.53)
						Gender	Se 0.89 (0.75, 0.97); Sp 0.41 (0.38, 0.44); LR + 1.51 (1.35, 1.71); LR - 0.26 (0.10, 0.65)
						BMI <23	Se 0.37 (0.22, 0.54); Sp 0.83 (0.81, 0.85) ; LR +2.22 (1.44 - 3.42); LR- 0.76 (0.59, 0.97)
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Age > 50 years	Se 0.63 (0.24, 0.91); Sp 0.66 (0.63, 0.69); LR + 1.84 (1.07-3.17); LR - 0.57 (0.23-1.39)
						Age > 54 years	Se 0.63 (0.24, 0.91); Sp 0.88 (0.86, 0.90); LR+ 2.57 (1.49, 4.44); LR- 0.50 (0.2, 1.21)
						Age > 64 years	Se 0.63 (0.24, 0.91); Sp 0.96 (0.94, 0.97); LR+ 7.13 (4.04,12.59); LR- 0.41 (0.17, 1.01)

						Age > 70 years	Se 0.50 (0.16, 0.84); Sp 0.96 (0.94, 0.97); LR+ 11.19 (5.33, 23.51); LR- 0.52 (0.26, 1.05)
						Age > 74 years	Se 0.25 (0.03, 0.65); Sp 0.97 (0.96, 0.98); LR + 9.39 (2.69, 32.75); LR- 0.77 (0.52, 1.15)
						Female Age > 54 years	Se 0.63 (0.24, 0.91); Sp 0.88 (0.86, 0.90); LR+ 5.39 (3.08, 9.43); LR - 0.42 (0.17,1.04)
						Female Age > 64 years	Se 0.63 (0.24, 0.91); Sp 0.96 (0.94, 0.97); LR + 14.59 (8.00, 26.61); LR - 0.39 (0.16, 0.96)
						Female Age > 74 years	Se 0.25 (0.03, 0.65); Sp 0.98 (0.98, 0.99); LR+ 16.17 (4.47, 58.43); LR- 0.76 (0.51, 1.14)
						Age > 50 years	Se 0.63 (0.24, 0.91); Sp 0.66 (0.63, 0.69); LR + 1.84 (1.07-3.17); LR - 0.57 (0.23-1.39)
Van Den Bosch	2004	Primary	N=2007	Patients referred with low back pain for lumbar spine radiography	Lumbar radiographs	Age > 54 years	Se 0.83 (0.73, 0.90); Sp 0.52 (0.49, 0.54); LR+ 1.72 (1.54, 1.91); LR-0.33 (0.20, 0.53)
						Age > 64 years	Se 0.78 (0.68, 0.87); Sp 0.68 (0.66, 0.70) LR + 2.46 (2.16, 2.8); LR- 0.32 (0.21, 0.48)
						Age > 74 years	Se 0.59 (0.48, 0.70); Sp 0.84 (0.82, 0.86); LR + 3.69 (3.00, 4.53); LR- 0.49 (0.38, 0.63)
						Female Age > 54 years	Se 0.63 (0.51, 0.73); Sp 0.69 (0.67, 0.71); LR +2.01 (1.68, 2.40); LR - 0.54 (0.41, 0.72)
						Female Age > 64 years	Se 0.59 (0.48, 0.70); Sp 0.59 (0.48, 0.70); LR + 2.75 (2.26, 3.35); LR - 0.52 (0.40, 0.68)

						Female Age > 74 years	LR + 4.14 (3.17, 5.44); LR - 0.62 (0.51 - 0.75)
						Gender	Se 0.72 (0.61, 0.82); Sp 0.43 (0.41, 0.45)
Deyo	1986	Primary	N=621	Patients presenting with LBP, 311 received imaging	X-ray - anteroposterior and lateral lumbar view	Age > 50 years	Se 0.79 (0.49, 0.95); Sp 0.64 (0.58, 0.69); LR+ 2.16 (1.58-2.95); LR- 0.34 (0.12-0.92)

Table S14: Diagnostic accuracy of demographics for the diagnosis of spinal malignancy

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Age > 50	Se 0.72; Sp 0.33; LR+ 1.06 (0.96, 1.17); LR- 0.87 (0.68, 1.11)
						Age > 70	Se 0.22; Sp 0.80; LR+ 1.1 (0.82, 1.47); 0.97 (0.9, 1.06)
Red flags to screen for malignancy in patients with low-back pain (Henschke, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Age > 50	Sp 0.66 (0.63; 0.69)
						Age > 70	Sp 0.95 (0.94; 0.96)
Jacobson	1997	Secondary	N=491	Patients with a complaint of middle to lower back pain	CT Scan	Age > 50	Se 1 (0.81,1); Sp 0.41 (0.35, 0.48)

Frazier	1989	Primary	N=1037	Patients with acute lumbosacral back pain	Diagnostic imaging and follow-up	Age >50	Se 0.50 (0.01, 0.99); Sp 0.74 (0.70, 0.78)
Deyo	1988	Primary	N=1975	Patients with a primary complaint of LBP of less than 1-month duration	Lumbar radiographs	Age > 50	Se 0.77 (0.46, 0.95); Sp 0.71 (0.69, 0.73)
Deyo	1986	Primary	N=621	Patients presenting with LBP, 311 received imaging	X-ray - anteroposterior and lateral lumbar view	Age > 50	Se 0.75(0.19, 0.99); Sp 0.70 (0.66, 0.74)

Table S15: Diagnostic accuracy of demographics for the diagnosis any serious spinal pathology

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Shaw	2020	Primary (ED)	N= 1000	Patients presenting to the ED with back pain	NA	Age over 70 years	Se 48.5; Sp 79.9 ; LR+ 1.9 (1.3, 2.8); LR- 0.7 (0.5–1.0)

Table S16: Diagnostic accuracy of patient history findings for the diagnosis of CES

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Tsiang	2019	Tertiary	N=500	Patients with LBP seen at a large tertiary care spine clinic	NA	Bladder dysfunction	Se 1.00; Sp 0.77
						Bladder dysfunction patient reported	Se 0.50; Sp 0.87
						Bowel dysfunction	Se 0.50; Sp 0.87
						Lower limbs weakness	Se 1.00; 0.77
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Bladder dysfunction	Se 0.22; Sp 0.90; LR+ 2.31 (1.25, 4.27); LR- 0.86 (0.72, 1.03)
						Bowel dysfunction	Se 0.14; Sp 0.95; LR+ 2.78 (1.23, 6.3); LR- 0.91 (0.8, 1.03)
Raison	2014	Primary (ED)	N=206	Patients with LBP attending the ED	MRI	Bladder dysfunction	Se 0.65 (0.44, 0.82); Sp 0.73 (0.66, 0.80); LR+ 2.45
						Bowel dysfunction	Se 0.65 (0.44, 0.82); Sp 0.73 (0.66, 0.80); LR+ 2.45
						Saddle dysfunction	Se 0.27 (0.12, 0.48); Sp 0.87 (0.81, 0.92); LR+ 2.11
What is the diagnostic accuracy of red flags related to cauda equina syndrome (CES), when compared to Magnetic Resonance Imaging (MRI)? A systematic review (Dionne, 2019)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				

Dionne	2019	Mixed (Secondary and tertiary care settings)	N=869	Adults who presented with a suspected CES from an insidious onset or herniated disc prolapse	MRI	Bowel incontinence (n=4 studies)	Se 0.18 (0.09, 0.32); Sp 0.86 (0.80, 0.91); LR+ 1.60 (0.65, 3.94); LR- 0.96 (0.78, 1.18)
			n=7			Leg pain (n=5 studies)	Se 0.46 (0.32, 0.59); Sp 0.65 (0.58, 0.72); LR+ 1.45 (0.81, 2.58); LR- 0.90 (0.60, 1.35)
						Urinary retention (n=5 studies)	Se 0.36 (0.25, 0.49); Sp 0.61 (0.54, 0.68); LR+ 0.99 (0.61, 1.61); LR- 1.06 (0.86)
						Urinary incontinence (n=5 studies)	Se 0.36 (0.25, 0.48); Sp 0.56 (0.49, 0.64); LR+ 0.80 (0.56, 1.14); LR- 1.13 (0.90, 1.43)
						Back pain (n=3 studies)	Se 0.92 (0.92, 0.98); Sp 0.30 (0.23, 0.37); LR+ 1,23 (0.77, 2.20); LR- 0.40 (0.05, 2.41)

Table S17: Diagnostic accuracy of patient history findings for the diagnosis of spinal fracture

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Tsiang	2019	Tertiary	N=500	Patients with LBP seen at a large tertiary care spine clinic	NA	History of trauma	Se 0.81; Sp 0.79
						Osteoporosis	Se 0.81; Sp 0.79
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	History of trauma	Se 24.7; Sp 88.6; LR+ 2.17 (1.86–2.54); LR- 0.84 (0.81, 0.89)
Enthoven	2016	Primary	N=669	Patients with back pain consulting their GP	Lumbar radiographs	Corticosteroids use	Se 0.18 (0.05, 0.31); Sp 0.93 (0.91, 0.95); LR+ 2.5 (1.1, 5.3); LR- 0.90 (0.8, 1.0)
						History of trauma	Se 0.21 (0.07, 0.35); Sp 0.97 (0.95, 0.98); +LR 6.2 (2.8, 13.5); LR- 0.80 (0.5, 1.3)
						Severe disability	Se 0.30 (0.14, 0.46); 0.87 (0.84, 0.90); LR + 2.3 (1.3, 4.2); LR- 0.8 (0.6, 1.0)
						Sudden decrease in height	0.09 (0.01, 0.19); Sp 0.97 (0.95, 0.98); LR+ 2.9 (0.9, 9.4); LR- 0.90 (0.8, 1.0)
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal	No regular exercise	Se 0.81 (0.65, 0.91); Sp 0.44 (0.43, 0.45); LR+ 1.5 (1.2, 1.6); LR- 0.43 (0.20, 0.80)

					alignment, vertebral body compression and spinal canal dimensions	Sitting decrease pain	Se 0.29 (0.27, 0.32); 0.81 (0.79, 0.83); LR+ 1.6 (1.2, 1.9); LR- 0.87 (0.82, 0.92)
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Corticosteroids use	Se 0.25; Sp 1.00; LR+ 48.5 (11.62, 165.22); LR- 0.75 (0.41, 0.93)
						History of trauma	Se 0.25; Sp 0.98; LR+ 10.0 (2.76, 26.36); LR- 0.77 (0.42, 0.95)
Red flags to screen for vertebral fracture in patients presenting with low-back pain (Williams, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal alignment, vertebral body compression and spinal canal dimensions	Osteoarthritis	Se 0.50 (0.33, 0.67); Sp 0.52 (0.50, 0.55); LR + 1.05 (0.76, 1.45); LR - 0.95 (0.69, 1.32)
						No regular exercise	Se 0.82 (0.66, 0.92); Sp 0.44 (0.42, 0.47); LR + 1.47 (1.25, 1.75); LR - 0.42 (0.21, 0.81)
						Absence of buttock / leg pain	Se 0.32 (0.18, 0.49); Sp 0.86 (0.84, 0.88); LR+ 2.24 (1.38, 3.64); LR- 0.80 (0.64, 0.99)
						Decreased pain on sitting	Se 0.29 (0.15, 0.46); Sp 0.23 (0.21, 0.25); LR + 1.56 (0.94, 2.59); LR - 0.87 (0.71, 1.07)
Reinus	1998	Tertiary	N=482	Patients with back pain presenting to the ED department	Lumbosacral radiographs	History of trauma	Se 0.07 (0.02, 0.18); Sp 0.60 (0.56, 0.65); LR+ 0.18 (0.07, 0.48); LR - 1.54 (1.38, 1.71)
Gibson	1992	Tertiary	N=225	Patients presenting to the ED department with lumbar pain of less than 48 hours	Plain radiographs	History of trauma	Se 1.00 (0.59, 1.00); Sp 0.51 (0.41, 0.62); LR+ 1.93 (1.48, 2.52); LR - 0.121 (0.01, 1.79)

Deyo	1986	Primary	N=621	Patients presenting with LBP, 311 received imaging	X-ray - anteroposterior and lateral lumbar view	Trauma	Se 0.36 (0.13, 0.65); Sp 0.90 (0.86, 0.93); LR+ 3.97 (0.20, 79.15); LR- 0.98 (0.89, 1.07)
						Corticosteroids use	Se 0.0 (0.0, 0.23); Sp 0.99 (0.98, 1.00); LR + 3.97 (0.20, 79.15); LR- 0.98 (0.89, 1.07)
Patrick	1983	Tertiary	N=552	Patients complaining of LBP presenting to the ED department	Lumbar radiographs	History of trauma	Se 0.80 (0.64, 0.91); Sp 0.55 (0.50, 0.59); LR+ 1.77 (1.48, 2.13); LR - 0.36 (0.20, 0.68)
Scavone	1981	Primary	N=871	Patients with LBP presenting to the university teaching hospital medical centre	Lumbar radiographs	History of trauma	Se 0.65 (0.44, 0.83); Sp 0.95 (0.93, 0.96); LR+ 12.85 (8.58, 19.24); LR- 0.36 (0.22, 0.62)
						Hip/leg pain	LR + 0.21 (0.01, 3.35); LR -1.08 (1.02, 1.14)
						Sciatica	Se 0.04 (0.00, 0.20); Sp 0.91 (0.89, 0.93)
A systematic review identifies five "red flags" to screen for vertebral fracture in patients with low back pain (Henschke, 2008)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Holmes	2003	Secondary	N=2404	Patients with back pain presenting to the ED department	Lumbar radiographs	Severe mechanism of injury	Se 0.61; Sp 0.64; LR+ 1.7 (1.4, 1.9); LR- 0.62 (0.50, 0.75)
Reinus	1998	Secondary	N=482	Patients with back pain presenting to the ED department	Lumbosacral radiographs	Acute trauma	Se 0.40; Sp 0.64; LR+ 1.1 (0.5, 2.0); LR- 0.94 (0.49, 1.31)

Table S18: Diagnostic accuracy of patient history findings for the diagnosis of spinal malignancy

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Tsiang	2019	Tertiary	N=500	Patients with LBP seen at a large tertiary care spine clinic	NA	History of malignancy	Se 91.7; Sp 77.8
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Night pain	Se 0.55; Sp 0.42; LR+ 0.85 (0.83,1.1); LR- 1.07 (0.9, 1.27)
						Unexplained weight loss	Se 0.08; Sp 0.96; LR+ 1.87 (1.1, 3.17); LR- 0.96 (0.92, 1.01)
						History of malignancy	Se 0.32; Sp 0.96; +LR 7.25 (5.65, 9.3); -LR 0.71 (0.64, 0.79)
Cook	2011	Tertiary	N=1109	Patients with LBP seen at a spine surgery center	Imaging	No pain during flexion	Se 0.67 (0.55, 0.77); Sp 0.41 (0.40, 0.42); LR+ 1.1 (0.9, 1.3); LR- 0.80 (0.56, 1.1)
						No pain during extension	Se 0.65 (0.54, 0.75), Sp 0.50 (0.49, 0.51); LR+ 1.3 (1.1, 1.5); LR- 0.70 (0.49, 0.94)
						No pain during right side flexion	Se 0.96 (0.88, 0.98); Sp 0.04 (0.04, 0.05); LR+ 0.94 (0.85,1); LR- 1 (0.92, 1.01)
						No pain during left side flexion	Se 0.96 (0.88, 0.98); 0.04 (0.03, 0.04); LR + 0.99 (0.91, 1); LR-1.1 (0.37, 3.2)
Donner-Banzhoff	2006	Primary	N=1378	Patients with LBP presenting to a GP	Experts opinions	Clinical judgment	Se 0.50; Sp 0.83; LR+ 2.95; LR- 0.6
Red flags to screen for malignancy in patients with low-back pain (Henschke, 2013)							
PRIMARY STUDIES							

First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Constant Progressive Pain	Se 0 (0.0, 0.0); Sp 0.97 (0.96, 0.96)
						Gradual Onset before age 40	Se 0 (0.0, 0.0); Sp 0.91 (0.90, 0.93)
						Insidious onset	Se 0 (0.0, 0.0); Sp 0.83 (0.80, 0.85)
						Previous history of cancer	Se 0 (0.0, 0.0); Sp 0.96 (0.95, 0.97)
						Systematically unwell	Se 0 (0.0, 0.0); Sp 0.96 (0.96, 0.97)
						Tried bedrest with no relief	Se 0 (0.0, 0.0); Sp 0.84 (0.81, 0.86)
						Unexplained weight loss	Se 0 (0.0, 0.0); Sp 1 (0.99, 0.1)
Donner-Banzhoff	2006	Primary	N=1378	Patients with LBP presenting to a GP	Experts opinions	Is the LBP familiar	Se 0 (0.0, 0.97); Sp 0.83 (0.81, 0.85)
Reinus	1998	Tertiary	N=482	Patients with back pain presenting to the ED department	Lumbosacral radiographs	Previous history of cancer	Se 1.0 (0.59, 1); Sp 0.97 (0.95, 0.96)
Deyo	1988	Primary	N=1975	Patients with a primary complaint of LBP of less than 1-month duration	Lumbar radiographs	Duration of this episode >1month	Se 0.50 (0.21, 0.79); Sp 0.81 (0.79, 0.83)
						Insidious onset	Se 0.62 (0.32, 0.86); Sp 0.42 (0.40, 0.44)
						Not improved after 1 month	Se 0.31 (0.09, 0.51); Sp 0.90 (0.89, 0.91)
						Previous history of cancer	Se 0.31(0.09, 0.61); Sp 0.96 (0.97, 0.99)
						Recent back injury	Se 0.0 (0.0, 0.25); Sp 0.82 (0.80, 0.84)
						Severe pain	Se 0.23 (0.05, 0.54); Sp 0.85 (0.83, 0.87)
						Thoracic pain	Se 0.17 (0.02, 0.48); Sp 0.84 (0.82,0.86)

						Tried bedrest with no relief	Se 1 (0.4, 1); Sp 0.46 (0.43, 0.49)
						Unexplained weight loss	Se 0.15 (0.02, 0.45); Sp 0.94 (0.93, 0.95)
Deyo	1986	Primary	N=621	Patients presenting with LBP, 311 received imaging	X-ray - anteroposterior and lateral lumbar view	Not improved after 1 month	Se 0.25 (0.01,0.81); Sp 0.90 (0.88,0.93)

Table S19: Diagnostic accuracy of patient history findings for the diagnosis of spinal infection

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Chills	Se 0.12; Sp 0.93; LR+ 1.71 (1.04, 2.81); LR- 0.95 (0.89, 1.01)
						Night pain	Se 0.58; Sp 0.42; LR+ 0.99; LR- 1.02
						Sweating	Se 0.12; Sp 0.93; LR+ 1.71 (1.04, 2.81); LR- 0.95 (0.89, 1.01)
						Persistent night sweating	Se 0.18; Sp 0.86, +LR 1.26 (0.85, 1.86); LR- 0.96 (0.88, 1.04)
						Recent infection	Se 0.24; Sp 0.97; LR+ 9.31 (6.63, 13.07); LR- 0.78 (0.7, 0.86)
Low Back Pain in the Emergency Department: Prevalence of Serious Spinal Pathologies and Diagnostic Accuracy of Red Flags (Galliker, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data

Davis	2011	Primary (ED)	N=55	Patients who present to ED with spine pain	Imaging	Intravenous drug abuse	LR+ 13.7 (11.4, 16.5); LR- 0.4 (0.3, 0.5)
						Recent spine fracture	LR+ 0.5 (5.0, 17.8); LR- 0.9 (0.8, 1.0)
						Immunocompromised	LR+ 5.1 (3.2, 8.0); LR- 0.9 (0.8, 0.9)
						Indwelling vascular catheter	LR+ 15.7 (7.9, 31.0); LR- 0.9 (0.9, 1.0)
						Other infection site	LR+ 13.7 (9.4, 19.8); LR- 0.8 (0.7, 0.9)

Table S20: Diagnostic accuracy of patient history findings for the diagnosis of serious spinal pathology

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Shaw	2020	Primary (ED)	N= 1000	Patients presenting to the ED with back pain	NA	Acute urinary retention or overflow incontinence	Se 15.2; Sp 97.6; LR+ 6.4 (2.6, 15.7); LR- 0.9 (0.8, 0.1)
						Anticoagulated	Se 9.1; Sp 95.4; LR+ 2.0 (0.6, 6.0); LR- 1.0 (0.9, 1.1)
						Constant progressive non-mechanical pain	Se 3; Sp 99.3; LR+ 4.2 (0.5, 33.1); LR- 1.0 (0.9, 1)
						Flank pain	Se 9.1; Sp 87.1; LR+ 0.7 (0.2, 2.1) LR- 1.0 (0.9, 1.2)
						Gradual onset before age 40	Se 0; Sp 99.6; LR+ 0.0; LR- 1.0
						Herpes zoster rash	Se 1.1 ; Sp 100; LR- 1.0 (1.0, 1.0)

						History of cancer	Se 15.2; Sp 92.1; LR+ 1.9 (0.8, 4.5); LR- 0.9 (0.8, 1.1)
						History of trauma (major in young/minor in elderly)	Se 27.3; Sp 90.7; LR+ 2.9 (1.6, 5.3); LR- 0.8 (0.7, 1)
						Immune suppression	Se 12.1; Sp 96.0; LR+ 3.0 (1.1, 7.9); LR- 0.9 (0.8, 1)
						Inflammatory arthritis or osteoporosis fracture	Se 30.3; Sp 93.4; LR+ 4.6 (2.6, 8.1); LR- 0.8 (0.6, 0.9)
						Insidious onset	Se 6.1; Sp 97.2; LR+ 2.2 (0.5, 8.8) LR- 1.0 (0.9–1.1)
						Intravenous drug use	Se 12.1; Sp 98.2; LR+ 6.9 (2.5, 19.4); LR- 0.9 (0.8, 1.0)
						Iritis, skin rashes (psoriasis), colitis, urethral discharge	Se 1.7; Sp 99.6; LR + 4.6 (0.9, 22.6); LR- 1.0 (1.0, 1.0)
						Known nephrolithiasis or abdominal aortic aneurysm	Se 6.1; Sp 95.6; LR+ 1.4 (0.3, 5.4) LR- 1.0 (0.9, 1.1)
						Known spinal Paget's disease	Se 0; Sp 99.9; LR+ 0; LR- 1.0
						Morning back stiffness 30 minutes	Se 0; Sp 99.8; LR+ 0; LR- 1.0
						Pregnancy	Se 0.6; Sp 99.8; LR+ 2.3 (0.2, 25.2); LR- 1.0 (1.0, 1.0)
						Progressive motor weakness in legs or gait disturbances	Se 3.0; Sp 98.4; LR+ 1.8 (0.3, 13.4); LR- 1.0 (0.9, 1.1)
						Prolonged use of corticosteroids	Se 12.1; Sp 96.9; LR+ 3.9 (1.5, 10.5); LR- 0.9 (0.8, 1)
						Recent infection	Se 18.2; Sp 96.0; LR + 4.5 (2.1, 9.9); LR- 0.9 (0.7, 1)

						Recent spinal procedure	Se 3.0; Sp 97.3; LR+ 1.1 (0.2, 8.1) LR- 1.0 (0.9, 1.1)
						Systemically unwell	Se 62.0; Sp 84.2; LR+ 2.8 (0.7, 11.4); LR- 1.0 (1.0, 1.0)
						TB history	Se 3.0; Sp 99.7; LR+ 9.8 (1.0, 91.4); LR- 1.0 (0.9–1.0)
						Thoracic/chest/abdominal pain	Se 3.0; Sp 94.1; LR+ 0.5 (0.1, 3.6); LR- 1.0 (1.0, 1.1)
						Tried bed rest but no relief	Se 0; Sp 99.8; LR+ 0.0; LR- 1.0
						Unexplained weight loss	Se 1.1; Sp 99.9; LR+ 9.2 (0.8, 100.6); LR- 1.0 (1.0, 1.0)
						Urinary symptoms	Se 27.3; Sp 88.7; LR + 2.4 (1.4, 4.3); LR- 0.8 (0.7, 1)
						Writhing in pain	Se 5.0; Sp 99.3; LR+ 6.9 (2.5, 19.9); LR-1.0 (0.9, 1.0)
Low Back Pain in the Emergency Department: Prevalence of Serious Spinal Pathologies and Diagnostic Accuracy of Red Flags (Galliker, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Thiruganasambandamoorthy	2014	Primary (ED)	N=329	Patients who present to an academic ED with nontraumatic LBP	Blood work, imaging or both	Current anticoagulants use	LR + 8.7 (3.1, 24.4); LR – 0.8 (0.6, 1.0)
						New urinary retention	LR+ 7.0 (1.9, 26.0); LR- 0.9 (0.7, 1.0)

Table S21: Diagnostic accuracy of physical examination findings for the diagnosis of CES

t

Can digital rectal examination be used to detect cauda equina compression in people presenting with acute cauda equina syndrome? A systematic review and meta-analysis of diagnostic test accuracy studies (Tabrah, 2022)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				
Tabrah	2022	Secondary and tertiary care settings	N=600	Adults presenting to secondary or tertiary care with acute CES	MRI	Digital rectal examination (anal tone)	LR+ 1.32 (0.94, 1.66); LR- 1.09 (0.94, 1.26); DOR 1.48 (0.87, 2.51)
			n=5				
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Venkatesan	2019	Tertiary	N=92	Adults presenting to tertiary care with acute CES	MRI	Anal squeeze	Se 0.29; Sp 0.96
Gooding	2013	Secondary	N=57	Adults presenting to the radiology department with suspected CES	MRI	Digital rectal examination (internal sensation)	Se 0.4 (0.1, 0.7); Sp (0.35, 0.68)
Domen	2009	Secondary	N=58	Adults presenting to tertiary care with acute CES	MRI	Anal reflexes	Se 0.38; Sp 0.60 (0.2, 4.2)
The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Raison	2014	Primary (ED)	N=206	Patients with LBP attending the ED	MRI	Saddle dysfunction	Se 0.27 (0.12, 0.48); Sp 0.87 (0.81, 0.92); LR+ 2.11

What is the diagnostic accuracy of red flags related to cauda equina syndrome (CES), when compared to Magnetic Resonance Imaging (MRI)? A systematic review (Dionne, 2019)							
POOLED DATA							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data (pooled estimates)
			Number of studies (n)				
Dionne	2019	Mixed (Secondary and tertiary care settings)	N=869	Adults who presented with a suspected CES from an insidious onset or herniated disc prolapse	MRI	Saddle anesthesia (n=4 studies)	Se 0.43 (0.31, 0.55); Sp 0.79 (0.74, 0.83); LR+ 1.73 (0.98, 3.08); LR- 0.80 (0.61, 1.05)
			n=7			Reduced anal tone (n=3 studies)	Se 0.29 (0.15, 0.47); Sp 0.83 (0.76, 0.88); LR+ 1.72 (0.91, 3.24); LR- 0.90 (0.86, 1.07)

Table S22: Diagnosis accuracy of physical examination findings for the diagnosis of spinal fracture

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Enthoven	2016	Primary	N=669	Patients with back pain consulting their GP	Lumbar radiographs	Percussion tenderness of spine	Se 0.21(0.07, 0.35); Sp 0.81 (0.78, 0.84); +LR 1.1 (0.6, 2.2); LR- 1.0 (0.8, 1.2)
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal alignment, vertebral body compression and spinal canal dimensions	Gait abnormality	Se 0.66 (0.50; 0.79); Sp 0.23 (0.22, 0.23); LR+ 0.86 (0.65, 1.02); LR- 1.5 (0.91, 2.2)

Hsu	2003	NA Retrospective chart review	N=200	Patients with confirmed thoraco- lumbar fracture and or following a general multi-trauma	NA	Midline tenderness	Se 0.62; Sp 0.92
						Palpable midline step	Se 0.14 Sp 1.00
						Back bruising	Se 0.69; Sp 0.99
						Abnormal neurological signs	Se 0.41; Sp 0.96
Red flags to screen for vertebral fracture in patients presenting with low-back pain (Williams, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Roman	2010	Secondary	N=1448	Patients with lumbar- related disorders	Standard radiograph or CT assessing sagittal alignment, vertebral body compression and spinal canal dimensions	No gait abnormality	Se 0.66 (0.49, 0.80); Sp 0.23 (0.21, 0.25); LR + 0.85 (0.68, 1.08); LR- 1.49 (0.95, 2.34)
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Sensation change	Se 0.0 (0.0, 0.37); Sp 0.98 (0.97, 0.99); LR+ 3.32 (0.22, 50.86); LR- 0.96 (0.82, 1.13)
Reinus	1998	Tertiary	N=482	Patients with back pain presenting to the ED department	Lumbosacral radiographs	Neurological signs	Se 0.05 (0.01, 0.15); Sp 0.92 (0.89, 0.94); LR + 0.69 (0.22, 2.17); LR - 1.03 (0.96, 1.10)
Gibson	1992	Tertiary	N=225	Patients presenting to the ED department with lumbar pain of less than 48 hours	Plain radiographs	Neurological signs	Se 0.29 (0.04, 0.71); Sp 0.88 (0.80, 0.94); LR + 2.40 (0.67, 8.70); LR- 0.81 (0.51, 1.30)
Patrick	1983	Tertiary	N=552	Patients complaining of LBP presenting to the ED department	Lumbar radiographs	Sensation change	Se 0.03 (0.00, 0.13); Sp 0.98 (0.97, 0.99); LR + 1.42 (0.19, 10.95); LR - 0.99 (0.94, 1.04)

						Motor deficit	Se 0.02 (0.00, 0.13); Sp 0.99 (0.98, 1.00); LR + 1.39 (0.08, 25.38); LR - 0.98 (0.96, 1.03)
						SLR	Se 0.18 (0.07, 0.33); Sp 0.83 (0.79, 0.86); LR + 1.02 (0.51, 2.05); LR - 1.00 (0.86, 1.16)
						Tenderness	Se 0.73 (0.56, 0.85); Sp 0.59 (0.54, 0.63); LR + 1.76 (1.42, 2.19); LR- 0.47 (0.28, 0.78)
						Contusion / abrasion	Se 0.85 (0.70, 0.94); Sp 0.97 (0.95, 0.98); LR+ 31.09 (18.25, 52.96); LR - 0.15 (0.07, 0.32)
						Spasm	LR + 1.47 (0.83, 2.60); LR - 0.90 (0.75, 1.09)
Scavone	1981	Primary	N=871	Patients with LBP presenting to the university teaching hospital medical centre	Lumbar radiographs	Sensation change	Se 0.27 (0.12, 0.48); Sp 0.27 (0.12, 0.48); LR+ 2.21 (1.14, 4.27); LR - 0.83 (0.66, 1.05)
						Motor deficit	Se 0.23 (0.09, 0.44); Sp 0.89 (0.87, 0.91); LR+ 2.19 (1.06, 4.54); LR- 0.86 (0.70, 1.06)
						Tenderness	Se 0.50 (0.30, 0.70); Sp 0.73 (0.70, 0.76); LR+ 0.70 (0.25, 1.97); LR - 1.11 (0.87, 1.41)
						Spasm	LR + 1.25 (0.42, 3.70); LR- 0.98 (0.85, 1.12)
A systematic review identifies five "red flags" to screen for vertebral fracture in patients with low back pain (Henschke, 2008)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Holmes	2003	Secondary	N=2404	Patients with back pain presenting to the ED department	Lumbar radiographs	Spinal pain	Se 0.72; Sp 0.35; LR + 1.1 (1.0, 1.2); LR- 0.79 (0.60, 1.01)
						Tenderness	Se 0.71; Sp 0.28; LR+ 1.0 (0.9, 1.1); LR- 1.04 (0.80, 1.33)

						Abnormal neurological exam	Se 0.09; Sp 0.91; LR+ 1.0 (0.6, 1.6); LR- 1.00 (0.94, 1.05)
Gestring	2002	Secondary	N=71	Blunt trauma patients requiring CT and x-ray	Lumbar radiographs	Tenderness on palpation	Se 0.40; Sp 0.54; LR+ 0.9 (0.4, 1.7); LR- 1.11 (0.56, 1.72)
Terregino	1995	Secondary	N=183	Blunt trauma patients able to be evaluated clinically	Lumbar radiographs	Pain	Se 0.47; Sp 0.88; LR+ 3.9 (1.9, 7.1); LR- 0.60 (0.35, 0.85)
						Tenderness	Se 0.53; Sp 0.93; LR+ 8.0 (3.8, 15.9); LR- 0.50 (0.28, 0.74)
						Deformity or neurological deficit	Se 0.12; Sp 1.00; LR+46.4 (2.3, 929.1); LR- 0.86 (0.72, 1.04)
Scavone	1981	Primary	N=871	Patients with LBP presenting to the university teaching hospital medical centre	Lumbar radiographs	Abnormal deep tendon reflex	Se 0.12; Sp 0.89; LR+ 1.1 (0.4, 2.8); LR- 0.99 (0.79, 1.08)

Table S23: Diagnostic accuracy of physical examination findings for the diagnosis of spinal malignancy

Red flags to screen for malignancy in patients with low-back pain (Henschke, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Altered sensation from the trunk down	Se 0 (0.0, 0.0); Sp 0.96 (0.97, 0.99)
Khoo	2003	Primary	N=1030	Patients with LBP; hip, leg, sacroiliac pain or trauma; neurological symptoms; possible malignancy; and	Imaging	Neurological symptoms	Se 0.0 (0.0, 0.97); Sp 0.97 (0.95, 0.96)

				inflammatory condition.			
Deyo	1988	Primary	N=1975	Patients with a primary complaint of LBP of less than 1-month duration	Lumbar radiographs	Fever (> 100°F)	Se 0 (0.0, 0.25); Sp 0.96 (0.97, 0.99)
						Muscle spasm	Se 0.15 (0.02, 0.45) Sp 0.66 (0.64, 0.68)
						Neurological symptoms	Se 0 (0.0, 0.26); Sp 0.91 (0.90, 0.92)
						Spine tenderness	Se 0.15 (0.02, 0.45) Sp 0.60 (0.58, 0.62)

Table S24: Diagnostic accuracy of physical examination findings for the diagnosis of spinal infection

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Fever	Se 0.12; Sp 0.93; LR+ 1.71 (1.04, 2.81); LR- 0.95 (0.89, 1.01)
Low Back Pain in the Emergency Department: Prevalence of Serious Spinal Pathologies and Diagnostic Accuracy of Red Flags (Galliker, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Davis	2011	Primary (ED)	N=55	Patients who present to ED with spine pain	Imaging	Systolic blood pressure <90 mm Hg	LR+ 9.0 (3.9, 20.7)

Table S25: Diagnosis accuracy of physical examination findings for the diagnosis of serious spinal pathology

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Shaw	2020	Primary (ED)	N= 1000	Patients presenting to the ED with back pain	NA	Anal tone loss or faecal incontinence	Se 0.09; Sp 0.99; LR+ 6.3 (1.9, 20.8); LR- 0.9 (0.8, 1)
						Central spine tenderness	Se 0.18; Sp 0.91; LR+ 2.0 (0.9, 4.1); LR- 0.9 (0.8, 1.1)
						Fever	Se 0.03; Sp 0.99; LR+ 2.0 (0.3, 14.4); LR- 1.0 (0.9, 1.1)
						Saddle anesthesia	Se 0.09; Sp 0.99; LR+ 11 (3.1, 39.6); LR- 0.9 (0.8,1.0)
						Sensory level (altered sensation trunk down)	Se 0.6; Sp 0.98; LR+ 0.3 (0.0, 2.0); LR-1.0 (1.0, 1.0)
Low Back Pain in the Emergency Department: Prevalence of Serious Spinal Pathologies and Diagnostic Accuracy of Red Flags (Galliker, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Thiruganasambandamoorthy	2014	Primary (ED)	N=329	Patients who present to an academic ED with nontraumatic LBP	Blood work, imaging or both	Bladder/suprapubic fullness	LR+ 40.2 (1.6; 979.1)
						Disturbance of saddle sensation	LR+ 7.0 (1.4, 36.0)

Table S26: Diagnosis accuracy of diagnostic support tools for the diagnosis of CES

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Combination of recent loss of bladder control and recent loss of bowel control	Se 0.08; Sp 0.97; LR+ 3 (1.01, 8.92); LR- 0.94 (0.85, 1.04)
Raison	2014	Primary (ED)	N=206	Patients with LBP attending the ED	MRI	Combination of bladder dysfunction/bowel dysfunction and saddle anesthesia	Se 0.27 (0.12, 0.48); Sp 0.92 (0.87, 0.96); LR+ 3.46

Table S27: Diagnosis accuracy of diagnostic support tools for the diagnosis of spinal fracture

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Combination of trauma and age > 50 years	Se 0.15; Sp 0.94; LR+ 2.54 (2.05, 3.16); LR- 0.90 (0.87, 0.94)
						Combination of trauma and age > 70 years	Se 0.05; Sp 0.99; LR+ 4.35 (2.92, 6.48); LR- 0.96 (0.94, 0.98)

Enthoven	2016	Primary	N=669	Patients with back pain consulting their GP	Lumbar radiographs	Diagnostic prediction model ≥ 1 positive features (osteoporosis, age of ≥ 75 years, trauma, back pain intensity score ≥ 7 and thoracic pain)	Se 0.88 (0.77, 0.99); Sp 0.42 (0.38, 0.46); LR+ 1.5 (1.3, 1.8); LR- 0.3 (0.1, 0.7)
						≥ 2 positive features	Se 0.70 (0.54, 0.85); Sp 0.81 (0.78, 0.84); LR+ 3.6 (2.8, 4.8); LR- 0.4 (0.2, 0.6)
						≥ 3 positive features	Se 0.30 (0.15, 0.46); Sp 0.95 (0.93, 0.97); LR+ 5.8 (3.2, 10.8); LR- 0.7 (0.6, 0.9)
Henschke	2009	Primary	N= 1172	Patients presenting with acute LBP	Imaging studies and specialist view	Henschke rule 1 sign positive (history of trauma, advanced age, prolonged use of corticosteroids and female gender)	Se 0.88 (0.47, 1.00); Sp 0.50 (0.47, 0.53); LR+ 1.75 (1.34, 2.29); LR- 0.25 (0.04, 1.57)
						Henschke rule 2 sign positive (2/4)	Se 0.63 (0.24, 0.91); Sp 0.96 (0.95, 0.97); LR+ 15.48 (8.45, 28.36); LR - 0.39 (0.16, 0.96)
						Henschke rule 3 sign positive (3/4)	Se 0.38 (0.09, 0.76); Sp 1.00 (1.00, 1.00); LR + 906.11 (50.37 - 16299.11); LR - 0.61 (0.36, 1.03)
Roman	2010	Secondary	N=1448	Patients with lumbar-related disorders	Standard radiograph or CT assessing sagittal alignment,	1 of 5 positive tests (age > 52 years, no presence of leg	Se 0.97 (0.89, 0.99); Sp 0.06 (0.06, 0.07); LR+ 1.04 (0.92, 1.1); LR- 0.39 (0.07, 2.1)

					vertebral body compression and spinal canal dimensions	pain, body mass index ≤ 22 , does not exercise regularly and female gender	
						2 of 5 positive tests	Se 0.95 (0.83, 0.99); Sp 0.34 (0.33, 0.34); LR+ 1.4 (1.3, 1.8); LR- 0.16 (0.04, 0.51)
						3 of 5 positive tests	Se 0.76 (0.61, 0.87); Sp 0.68 (0.68, 0.69); LR+ 2.5 (1.9, 2.8); LR- 0.34 (0.19, 0.46)
						4 of 5 positive tests	Se 0.37 (0.24, 0.51); Sp 0.96 (0.95, 0.97); LR+ 9.6 (3.7, 14.9); LR- 0.65 (0.50, 0.79)
						5 of 5 positive tests	Se 0.03 (0.01, 0.08); Sp 0.99 (0.98, 0.99); LR+ 9.3 (1.4, 60.2); LR- 0.97 (0.92, 0.99)

Table S28: Diagnostic accuracy of diagnostic support tools for the diagnosis of spinal malignancy

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Combination of unexplained weight loss and history of malignancy	Se 0.03; Sp 0.99; LR+ 10.25 (3.6, 29.21); LR- 0.98 (0.95,1)

Red flags to screen for malignancy in patients with low-back pain (Henschke, 2013)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Deyo	1988	Primary	N=1975	Patients with a primary complaint of LBP of less than 1-month duration	Lumbar radiographs	Combination of age greater than 50 years, history of malignancy, unexplained weight loss and failure to improve with conservative therapy	Se 1.00

Table S29: Diagnostic accuracy of diagnostic support tools for the diagnosis of spinal infection

The diagnostic value of red flags in thoracolumbar pain: a systematic review (Maselli, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Premkumar	2018	NA Retrospective study of medical files	N= 9940	Patients visiting their medical doctor for a chief complaint of LBP	Imaging reports	Combination of fever, chills or sweating, and a recent infection	Se 0.08; Sp 0.99; LR+ 13.15 (6.66, 25.97); LR- 0.93 (0.88, 0.98)
Low Back Pain in the Emergency Department: Prevalence of Serious Spinal Pathologies and Diagnostic Accuracy of Red Flags (Galliker, 2020)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data

Davis	2011	Primary (ED)	N=55	Patients who present to ED with spine pain	Imaging	Classic triad (Fever $\geq 38^{\circ}\text{C}$, spine pain and neurological deficit)	LR+ 5.7 (1.4, 23.2)
Davis	2004	Primary (ED)	N=189	Patients with spinal epidural abscess presenting to the ED	Imaging	Classic triad (Fever $\geq 38^{\circ}\text{C}$, spine pain and neurological deficit)	Se 0.08; Sp 0.99; LR+ 10.0; LR- 0.93

Table S30: Diagnostic accuracy of diagnostic support tools for the diagnosis of inflammatory back pain

Diagnostic Clinical Prediction Rules for Specific Subtypes of Low Back Pain: A Systematic Review (Haskins, 2015)							
PRIMARY STUDIES							
First author	Year of publication	Setting(s) of data collection	Number of participants (N)	Population	Reference standard	Index test	Diagnostic accuracy data
Braun	2013	Primary	N= 322	Patients with LBP > 2mo presenting to orthopaedic surgeons, most with ≥ 1 inflammatory back pain symptoms	Diagnosis of axial SpA as determined by a rheumatologist (dichotomous)	(1) age at onset ≤ 35 yrs; (2) alternating buttock pain; (3) improvement with NSAIDs within 48h; (4) waking up in the second half of the night; (5) improvement with movement and not with rest	For 4 or more predictors present: Se 0.48; Sp 0.86; +LR 3.4; -LR 0.6
Chan	2012	NA	N=25	Patients with anterior uveitis	Diagnosis of inflammatory back pain by rheumatologist (dichotomous)	Berlin criteria: (1) morning stiffness, (2) improvement in back pain with exercise but not with rest; (3) awakening because of	For 2 or more predictors present: Se 0.92; Sp 0.67; LRs not reported but calculated to be +LR 2.8 (1.2, 6.3); -LR 0.12 (0.02, 0.79)

						back pain in the second half of the night only; (4) alternating buttock pain	
Sieper	2009	NA	N=648	Patients with chronic back pain of unknown origin that began before 45 yrs of age	Diagnosis of inflammatory back pain by rheumatologist (dichotomous)	Berlin criteria	For 2 or more predictors present; Se 0.70; Sp 0.81; LRs not reported but approximated to be +LR 3.8 (2.8, 5.0); -LR 0.37 (0.31, 0.43)
						(1) age at onset < 40 yrs, (2) insidious onset; (3) improvement with exercise; (4) no improvement with rest; (5) pain at night with improvement on getting up	For 4 or more predictors present: Se 0.80; Sp 0.72; LRs not reported, but approximated to be +LR 2.9 (2.3, 3.6); -LR 0.28 (0.23, 0.35)
Rudwaleit	2004	NA	N=213	Patients with chronic back pain already diagnosed with either AS or mechanical LBP	Diagnosis of AS by a rheumatologist or other specialist prior to the study, using the modified New York criteria (dichotomous)	Berlin criteria	For 2 or more predictors present: Se 0.70 (0.61, 0.78); Sp 0.81 (0.73, 0.87); +LR 3.7 (2.5, 5.6); -LR 0.4 (0.3, 0.5)

File S31: Medline Search Strategy

sensitivity or specificity or validity or accuracy or "predictive value" or "predictive validity" or "diagnostic accuracy" or "diagnostic performance" or "diagnostic value" or "test performance" or "diagnostic utility" or "diagnostic ability" or "posttest probability" or "predictive validity" or (discriminative N3 (value or validity or performance or ability

((diagnos* or clinical) N3 (test* or examination or evaluation* or assessment* or indicator* or finding* or feature* or history or sign* or symptom*)) or (neurologic* N3 (test* or examination*)) or "diagnostic test*" or (physical N3 (examination* or test* or evaluation* or assessment* or sign* or symptom*)) or "sensory test*" or "motor test*" or "muscle test*" or "muscle strength" or evaluation or assessment or imaging or x-rays or radiograph* or "magnetic resonance imaging" or MRI or tomograph* or scan or ultraso* or electromyograph* or EMG or electrodiagnos* or (conduction N3 (nerve or motor)) or "electrical stimulation" or "nerve root block*" or (injection* N3 ("nerve root*" or epidural or joint)) or discograph* or scintigraph* or (history N3 (taking or patient or clinical or medical or family)) or "patient interview" or (screening N3 (tool* or instrument* or question*)) or questionnaire* or prognosis or prediction or discriminat* or "prognostic screening" or ((prognostic or predictive) N3 (factor* or indicator*)) or "prediction rule*" or ((criteria or model) N3 (diagnostic or classification) or "yellow flag*" or "red flag*" or biomarker* or (blood N3 (test* or analysis or marker* or factor* or work* or count or parameter*)) or (laboratory N3 (test* or analysis or profile or marker* or biomarker* or parameter*)) or HLAB27 or HLA-B27 or (inflammat* N3 (marker* or biomarker*)) or (gene* N3 (marker* or biomarker*)) or antibod*

("low back pain" or "lower back pain" or "lumbar radiculopath*" or "lumbosacral radiculopath*" or ("lumbar dis*" N3 hernia*) or ("intervertebral dis*" N3 hernia*) or "lumbar spinal stenosis" or "lumbar pain" or "low back ache" or lombago or lumbalgia or "lumbar spine" or "low back disorder*" or "lumbar spinal condition*" or "lumbar radicular pain" or "lumbar radicular symptom*" or "lumbosacral pain" or sciatica or "radiating leg pain" or "low back related leg pain" or "back pain" or "back ache" or "neurogenic claudication" or "intermittent claudication" or "axial spondyloarthritis" or "inflammatory back pain" or "ankylosing spondylitis" or "cauda equina syndrome" or "underlying spinal condition*" or (spin* N3 (fracture* or malignancy or neoplasm* or pathology*)))

AB ((systematic N3 review*) or guideline*) OR TI ((systematic N3 review*) or guideline*) OR SU ((systematic N3 review*) or guideline*) OR PT ((systematic N3 review*) or guideline*)