Supplementary file 4

Table S9. Detailed judgment for risk of bias assessments.

Author, year	Bias	Author's judgment	Support for judgment
Heliovaara, 1987	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	Outcome was adopted from existing ICD codes.
	Incomplete outcome data (attrition bias)	Low risk	No losses to follow-up.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Author, year	Bias	Author's judgment	Support for judgment
Hartwig et al., 1997	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	No information provided.
	Incomplete outcome data (attrition bias)	Low risk	Cross sectional analysis.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Author, year	Bias	Author's judgment	Support for judgment
Savage et al., 1997	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	Scans were independently assessed by two radiologists. No further information was provided.
	Incomplete outcome data (attrition bias)	High risk	89 (60%) of the original study population. Losses likely to affect the final results.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Author, year	Bias	Author's judgment	Support for judgment
Michaelis et al., 2002	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear Risk	No information provided.
	Incomplete outcome data (attrition bias)	Low risk	Case-control analysis.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Author, year	Bias	Author's judgment	Support for judgment
Chung et al., 2013	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	Outcome was adopted from existing ICD codes.
	Incomplete outcome data (attrition bias)	Low risk	National Health Insurance (NHI) Research Database. No losses.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Author, year	Bias	Author's judgment	Support for judgment
D'Agostin & Negro, 2017	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	Outcome was assessed on the basis of radiological reports. No further information was provided.
	Incomplete outcome data (attrition bias)	Low risk	Cross sectional analysis.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported.

Table Sx. (continued).

Author, year	Bias	Author's judgment	Support for judgment
Makino et al., 2017	**Random sequence generation (selection bias)**	High risk	No randomisation possible due to research question.
	Allocation concealment (selection bias)	High risk	Allocation was made by the professional title and could therefore not be concealed.
	Blinding of participants and personnel (performance bias)	High risk	Exposure impossible to blind.
	Blinding of outcome assessment (detection bias)	Unclear risk	Scans were independently assessed by three spine surgeons. No further information was provided.
	Incomplete outcome data (attrition bias)	High risk	261 (75%) participants lost to follow-up. Reasons for the losses were non-response or refusal to participate. Losses likely to affect the final results.
	Selective reporting (reporting bias)	Low risk	Pre-specified outcome was reported