

ONLINE RESOURCE 3

Table 1: Data extraction

Title: Clinical course of pain and disability following primary lumbar discectomy: systematic review and meta-analysis

Journal: European Spine Journal

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Prospective cohort	Surgical procedure	Mean duration of symptoms	Number of participants	Setting	Intervention during follow up phase	Pain outcome measure	Disability outcome measure	Baseline	Follow up assessment points	Losses to follow up	Results
Abou-Zeid, 2014	Microscopic lumbar discectomy	More than 4 mths	N=50	One NHS Trust in the UK	None reported	VAS BP VAS LP 0-10 cm	None	Pre - operative	3-6 months post surgery	None reported	Mean taken from figure Pre-operative VAS BP: 7.5 VAS LP: 8.5 Post op VAS BP: 2.0 VAS LP: 1.8 Requested data from authors; no reply
Alo, 2004 (immediate) Alo, 2005 (1 year)	Percutaneous lumbar discectomy	More than 6 months	N=50 Initial cohort utilising the Dekompress or 1.5mm percutaneous	Not reported	Other possible interventions not reported	VAS LP 0-10 cm	Self-reported measure of function	Pre-operative	6 months 1 year	None at 6 months 8 (16%) patients lost to follow up at 12 months	Mean(SD) Pre-operative: 7.92 (1.2) (from 2005 paper) 6 mths: 3.1 (1.8) 12 mths: 2.79(1.8)
Amoretti 2013	Discectomy under CT and	Not reported	N=200 2 groups	University teaching	3 days of anti-	VAS 0-10 cm	None	Pre-operative	Day 2 1 month	No losses to follow up	Mean(SD) Group 1

	fluoroscopic guidance		1] medial disc (n=46) 2] lateral disc (n=154)	hospital in France	inflammatory medication None other reported				6 months post surgery		Baseline: 7.9 (2.5) 2 days: 3.2 (2.1) 1 mth: 3.9 (1.2) 6 mths: 2.7 (1.2) Group 2 Baseline: 8.2 (3.2) 2 days: 2.8 (1.5) 1 mth: 1.5 (0.9) 6 mths: 1.1 (0.5)
Andrade, 2016	Discectomy	Not reported	N=12	University medical centre Netherlands	Other possible interventions not reported	VAS LP 0-10	None	Pre-operative	6 weeks 6 months	No losses to follow up	Mean (SD) Pre-operative VAS LP: 7.56 (1.06) 6 weeks VAS LP: 2.63 (1.10) 6 months VAS LP: 3.07 (1.68)
Arpino, 2004	Microdiscectomy	Not reported	N=73	Department of Neurosurgery of the second University of Naples In Italy	Other possible interventions not reported	VAS 0-10 cm	None	Pre-operative	3 months 12 months	No losses to follow up	Mean(range) Baseline 6.4 (1.4–10.0) 3 mths 3.9 (0–10.0) 12 mths 3.1 (0–10.0) No SD data available
Asch, 2002	Outpatient microscopic discectomy	Mean symptom duration 7.7 months (SD 16.3 months)	N=212	3 hospitals USA	24 patients had further surgery No other reported	VAS LP & BP 0-10 cm	ODI	1-2 weeks pre-operatively	1 day 10 days 6 week 6 months At least 1 year	4 (2%) loss to follow up Losses at final follow up 27% so previous follow up data used	Mean(SD) Pre-operative VAS LP: 6.6(2.6) VAS BP: 6.25(2.7) ODI: 50(23) 1 day: VAS LP: 0.75(1.4)

									No ODI at 1 and 10 days	Missing data Oswestry (74% at baseline, 61% at 6 weeks, 59% at 6 months, 18% at >1 year)	VAS BP: 3.0(2.1) 10 days: VAS LP: 2.6(2.1) VAS BP: 3.1(1.9) 6 weeks: VAS LP: 2.0(1.8) VAS BP: 2.6(2.0) ODI: 25(24) 6 mths: VAS LP: 2.0(1.8) VAS BP: 2.6(2.0) ODI: 23(26) >1year: VAS LP: 2.4(2.2) VAS BP: 2.9(2.1) ODI: 22(27)
Atlas, 1996 (1 year) Atlas, 2001 (5 years) Atlas, 2005 (10 years) Keller, 1999 (Maine study)	95.9% patients underwent open discectomy.	Not reported	N=275 (from 1996 paper, note different value in subsequent paper) treated surgically	Community - based practices in one state of USA	Fifty-three of 273 surgically treated patients (19.4%) had at least one reoperation over 5 years (median time to reoperation, 19 months). No other reported		Modified RMDQ	Pre-operative In the patients home prior to intervention	3 months 6 months 12 months 2 years 3 years 4 years 5 years	20% loss to follow up (1 and 5 years) The number of patients reporting each variable ranged from 212 to 218 At 10 years - 188 to 217 patients	Mean(SD) RMDQ Pre-operative 17.7(4.0) (from 2005 paper) 3 mths 8.0(?) 6 mths 7.8(?) 9 mths 7.7(?) 12 mths 7.7(?) 5 yrs 6.2 (6.7) RMDQ 10 years 6.0 (7.0) Requested data from authors; no reply
Bono, 2017	Percutaneous lumbar discectomy	Not reported	N=108	Two hospitals in Boston, USA	Patients randomised post-surgery to short and long periods	VAS BP VAS LP 0-10	Modified ODI 1-100	Pre-operative	2 weeks 6 weeks 3 months 1 year 2 years	9% losses at 2 weeks, 24% at 6 weeks, 25% at 3	Mean (SD) Short restrictions: Pre-operative

					of post op restrictions. Patients referred for rehabilitation on an individual basis N=10 reherniation N=3 revision surgery					months, 37% at 1year, 46% at 2 years	VAS BP: 51.9 (26.4) VAS LP: 69.9 (22.2) ODI: 56.4 (17.5) 2 weeks VAS BP: 20.3 (19.5) VAS LP: 22 (18.8) ODI: 30.3 (17) 6 weeks VAS BP: 16.6 (20.4) VAS LP: 23.3 (27) ODI: 19.9 (18) 3 months VAS BP: 17 (20.2) VAS LP: 21.2 (22.6) ODI: 18.6 (17.1) 1 year VAS BP: 11.6(18.1) VAS LP: 16.1 (25.1) ODI: 13.9 (14.9) 2 years VAS BP: 15.8 (22.9) VAS LP: 14.3 (21.5) ODI: 15.5 (20.2) Long restrictions: Pre-operative VAS BP: 45.5 (29.9)
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											VAS LP: 68.7 (23.2) ODI: 52.6 (18.8) 2 weeks VAS BP: 22.4 (20.1) VAS LP: 27.8 (23.6) ODI: 32 (16.4) 6 weeks VAS BP: 18.8 (18.8) VAS LP: 22.5 (23.4) ODI: 20.2 (17.4) 3 months VAS BP: 15.6 (14.2) VAS LP: 15.3 (15.4) ODI: 14.3 (13.8) 1 year VAS BP: 13.9 (14.3) VAS LP: 15.2 (16.9) ODI : 11.6 (10.2) 2 years VAS BP: 16.9 (24.1) VAS LP: 19.7 (28.1) ODI: 13.8 (17.2)
Casal-Moro, 2011	Microdiscectomy	Mean duration of symptoms 8.7 months (range 1-60 months)	N=122	University hospital Spain All operations performed	9 patients underwent further surgery Other possible	VAS BP VAS LP 0-10	ODI 1-100	Pre-operative	2 months 1 year 5 years	4% loss to follow up at 2 months, 3% at 1 year, and	Mean (SD) Pre-operative VAS LP: 7.9 (1.2) VAS BP: 4.6 (2.5) ODI: 69.6 (14.1) 2 months

				by 2 senior surgeons	interventions not reported					9% at 5 years	VAS LP: 1.2 (1.4) VAS BP: 1.9 (1.7) ODI: 14.1 (10.7) 1 year VAS LP: 1.1 (1.5) VAS BP: 2.2 (4.2) ODI: 10.7 (11.4) 5 years VAS LP: 1.7 (2.2) VAS BP: 2.6 (2.2) ODI: 16.6 (16.4)
Casimiro, 2017	Full endoscopic interlaminar approach (FEIA) and open minimally invasive microsurgical technique (MMST)	Not reported	N=44 N=28 FEIA N= 18 MMST	One neurosurgery department , Portugal	Post operative care e.g. pharmacology and activity were standardised	Back and leg pain NRS 0-10	Quebec Back Pain Disability Scale (QBPDS) 0-100 (0=normal)	Pre-operative	1 week 2 weeks 4 weeks	FEIA 7% losses MMST no losses to follow up	Mean FEIA Pre-operative NRS BP 7.7 NRS LP 8.2 QBPDS 57.7 1 week NRS BP 1.5 NRS LP 0.3 QBPDS 25.0 2 weeks NRS BP 0.3 NRS LP 0.1 QBPDS 18.0 4 weeks NRS BP 0.2 NRS LP 0.0 QBPDS 14.2 MMST Pre-operative NRS BP 7.6 NRS LP 8.0 QBPDS 59.8 1 week NRS BP 3.6 NRS LP 1.3 QBPDS 41.1 2 weeks

											NRS BP 2.4 NRS LP 0.9 QBPDS 34.7 4 weeks NRS BP 1.6 NRS LP 0.1 QBPDS 23.0 No SD data available from author.
Chaichana, 2011	Posterior open microdiscectomy	Not reported	N=67	2 medical institutions in the USA	Other possible interventions not reported	VAS BP VAS LP 0-10 cm	ODI 0-100	Pre - operative	6 weeks 3 months 6 months 12 months post surgery	No losses to follow up at 12 months	Mean(SD) Pre-operative VAS BP: 6.1(5.6) VAS LP: 6.1(5.6) ODI: 49.9(17.6) 12 months (Improvement reported and needed data for other timepoints) Requested data from authors; no reply
Chen, 2011	Microdiscectomy	Mean duration of leg pain 61 days (range 2 days to 13 months)	N=123	2 spine surgeons in 2 medical centres in China	Other possible interventions not reported	VAS BP VAS LP 0-100	ODI 0-100	Pre - operative	3 months 6 months 12 months Post surgery	Not reported	mean (range) Pre-operative VAS BP 57.65 (0–100) VAS LP 75.88 (10–100) ODI 48.49 (14–84) 3mths VAS leg: 10 VAS back: 11 ODI: 13 6mths

											VAS leg: 9 VAS back: 10 ODI: 10 12 months VAS BP: 10.54 (0–20) VAS LP: 11.11 (0–30) ODI: 9.13 (0–22) No means at other timepoints or SD. Requested data from authors; no reply
Chen, 2018	Percutaneous transforaminal endoscopic discectomy (PTED) or microdiscectomy (MD)	Not reported	N=153 n =80 PTED n=73 MD	One hospital China	Reoperation n=5 PTED and n=3 MD	VAS BP VAS LP 0-10	ODI 1-100	Pre-operative	1 week 1 month 3 months 6 months 1 year	10.5% losses at 1 year	Mean (SD) PTED Pre-operative VAS BP 3.9 (2.6) VAS LP 5.5 (1.9) ODI 44.2 (21.8) 1 week VAS BP 1.4 (1.8) VAS LP 1.8 (2.3) ODI 29.7 (18.9) 1 month VAS BP 1.1 (1.5) VAS LP 1.5 (1.9) ODI 18.9 (17.9) 3 months VAS BP 0.9 (1.5) VAS LP 1.1 (1.5) ODI 11.3 (13.6) 6 months VAS BP 0.6 (1.2) VAS LP 0.6 (1.3) ODI 6.0 (8.4) 1 year VAS BP 0.5 (1.3)

											VAS LP 0.6 (1.4) ODI 3.9 (7.6) MD Pre-operative VAS BP 3.7 (2.6) VAS LP 5.5 (2.2) ODI 43.8 (20.4) 1 week VAS BP 1.6 (1.8) VAS LP 2.1 (2.2) ODI 31.0 (18.8) 1 month VAS BP 1.1 (1.6) VAS LP 1.3 (1.7) ODI 19.6 (14.8) 3 months VAS BP 0.8 (1.3) VAS LP 1.0 (1.7) ODI 9.2 (9.1) 6 months VAS BP 0.5 (0.8) VAS LP 0.6 (1.2) ODI 5.1 (6.7) 1 year VAS BP 0.4 (0.8) VAS LP 0.4 (1.0) ODI 3.2 (5.7)
Chin, 2008	Microdiscectomy	Mean duration of symptoms group 1 25.6 months (range 4-120) Mean duration of symptoms Group 2	N=30 Group I n=15 with modic type I and II changes Group II n=15 without modic changes	One department of orthopaedics, USA All operations by one surgeon	Other possible interventions not reported	VAS (leg and back) 0-10	ODI	Pre-operative	1, 3, 6 month No ODI at 1 and 3 months post op	No losses at 1 month, 7% at 3 months, 7% at 6 months	Mean (group) Pre-operative VAS: 6.9(I) VAS: 6.3 (I) ODI: 69 (I) ODI: 61 (II) 1 month VAS: 1.9 (I) VAS: 2.0 (II) 3 months VAS: 2.5 (I) VAS: 2.3 (II)

		17.5 months (range 5-120)									6 months VAS: 2.3 (I) VAS: 1.6 (II) ODI: 29 (I) ODI: 10 (II) No SD available
Choi, 2013	Percutaneous endoscopic lumbar discectomy via the transforaminal approach using an XMR protocol	Mean duration back pain 156.8 weeks Mean duration leg pain 18 weeks	N=89	1 hospital South Korea	8 patients required further surgery Other possible interventions not reported	VAS LP & VAS BP	ODI	Pre-operative	12 weeks	No losses to follow up	Mean Pre-operative VAS BP: 4 VAS LP: 7.99 ODI: 67.4 12 weeks VAS BP: 2.3 VAS LP: 1.04 ODI: 5.61 No SD available
D'Angelo, 2010	Microdiscectomy	Not reported	N=133	1 neurosurgery department in Italy	Other possible interventions not reported	VAS pain 0-10	None	Pre-operative	1 month 3 months 6 months 12 months	19% excluded owing to lack of adherence to psychometric evaluation	Median (IQR) VAS Pre-operative: 8 (7-10) 1 mth: 4 (0-6.5) 3 mths: 3 (0-5) 6 mths: 2 (0-5) 12 mths: 2 (0-5) No means and SD available
De Bonis, 2017	Transpar microdiscectomy	Median 2 mths mode 2 mths , range 2 weeks – 2 years	N=47	Two neurosurgery departments Rome, Italy	Complications and drug management following surgery reported. No recurrence and no reoperation.	NRS 0-10	None	Pre-operative	1 week (discharge) 1 month 6 months 12 months	No losses to follow up	Mean (SD) Pre-operative NRS 8.95 (1.09) 1 week NRS 2.43 (1.64) 1 month NRS 1.66 (1.15) 6 months NRS 1.51 (1.20) 12 months 1.45 (1.08)

Dedering, 2012 Dedering, 2006	Microdiscectomy	Pain duration mean (SD) 8.4 (4.7) months	N=43 Analysed by gender Men n=27 Women n=14 N=36 followed through to 2 years	Not stated	No re-operation Other possible interventions not reported	Borg CR-10 scale included leg and back pain related to muscle testing only	RMDQ ODI	1 day prior to surgery	4 weeks post surgery 2 years post surgery	Loss to follow up Men 7% Women 14% 16% losses at 2 years	Mean (SD) Pre-operative RMDQ: 13 (5.1) ODI: 42 (16) 4 weeks RMDQ: 8 (5.5) ODI: 22 (19) 2 yrs RMDQ: 5 (6.0) ODI: 27 (14)
den Boer, 2006a den Boer, 2006b	Lumbar disc surgery for lumbosacral radicular syndrome	<3 months in 16% 3-6 months in 26% >6 months and < 1 year in 38% > 1 year in 20%	N=336 N=200 Working population of above cohort (2006b)	4 hospitals in Netherlands	Other possible interventions not reported	VAS 0-100 back & leg pain combined	RMDQ Dutch version	1 day pre operatively	3 days (not RMDQ and not reported VAS) 6 weeks 6 months post surgery	18% loss to follow up	Mean (SD) Pre-operative VAS: 47.3 (21.6) RMDQ: 15.3(4.1) 6 weeks: VAS: 17.5 (18.7) RMDQ: 7.8 (5.5) 6 mths: VAS: 18.8(22.23) RMDQ: 6.4 (6.2)
Dewing, 2008	Single-level microdiscectomy	Mean 7.9 months (range 4–19 months)	N=197	Not stated; military population	Patients all had other interventions including limited duty, physical therapy, anti-inflammatories, opioid analgesics, or epidural/transforaminal injections for at least 4 months	VAS LP 0-10 in cm VAS BP 0-10 in cm	ODI	Pre-operative	6 months A final follow up visit	7% loss to follow up	Mean (range) Pre-operative VAS LP: 7.17 (4-10) VAS BP: 4.30 (0-10) ODI: 53.6 (40–80) Final FU VAS LP: 2.5 (0-9) VAS BP: 2.7 (0-8) ODI: 21.2 (0–70)
Dubourg, 2002	Microsurgical discectomy (3)	31.4 days of sciatica	N=39 (surgical patients)	Two neurosurge ry	Other possible	VAS 0-100mm pain	None	Pre surgery at inclusion	1, 3, and 6 months	10% loss to follow up at 6 months	Mean (SD) VAS

	open discectomy (13) open discectomy with foraminotomy (2) open discectomy with laminectomy (16) ablation of discal extruded fragment without discectomy (3) laminectomy (2)			department s and 15 rheumatology centers	interventions not reported				post inclusion		Pre-operative: 52.2 (28.5) 6 mths: 13.2 (18.8)
Eguchi, 2016	Microdiscectomy	Mean duration of LP of 38 days (14 to 58)	N=13	National hospital Japan	Other possible interventions not reported	VAS LP 0-100 VAS BP 0-100	RMDQ 0-24	Pre-operative	6 months	7.7% loss to follow up at 6 months	Mean (SD) Pre-operative VAS BP 59.2 (24.7) VAS LP 78.4 (25.0) RMDQ 14.6 (6.2) 6 months VAS BP 10.8 (13.6) VAS LP 9.5 (12.7) RMDQ 1.9 (2.3)
Eicker, 2013	Microdiscectomy	Mean duration of symptoms 12.5 weeks (range 1–90 weeks)	N=51 (3 patients presenting with recurrent prolapses?)	One centre, Hamburg, Germany	N=2 had re-operation within 6 mths	VAS LP VAS BP	ODI	Pre - operative	6 months Post surgery	Not reported	Mean (range) Pre-operative VAS LP: 7.9 (3-10) VAS BP: 2.4 (0-7) ODI: 42.0 6 months: VAS LP: 1.3 (0-4) VAS BP: 1.4 (0-7) ODI: 12.3 No SD available. Requested data from authors; no reply

Elkan, 2016	Discectomy or microdiscectomy	Not reported	N=180	Hospital Sweden	Heparin prescribed for non-elective patients (n = 43) Other possible interventions not reported	VAS LP 0-100 VAS BP 0-100	ODI 1-100	Pre-operative	6 weeks 12 months 24 months	9.5% losses	Mean (SD) Pre-operative VAS BP 51.44 (28.49) VAS LP 64.16 (23.09) ODI 49.79 (21.04) 6 weeks VAS BP 21.30 (21.68) VAS LP 19.87 (22.48) ODI 27.56 (17.59) 6 months VAS BP 25.50 (26.25) VAS LP 18.71 (23.78) ODI 21.87 (18.21) 1 year VAS BP 23.42 (25.71) VAS LP 18.18 (23.58) ODI 21.11 (19.16) 2 years VAS BP 23.30 (26.43) VAS LP 19.39 (25.49) ODI 20.64 (18.43) Calculated from raw data
Fakouri, 2015	Microdiscectomy	Not reported	N=68 (n=34 obese and n=34 non-obese patients)	One surgeon, one Trust, UK	Other possible interventions not reported	VAS 0-10	None	Pre - operative	20-60 months post surgery	13.6% loss to follow up	Mean (SD) Pre-operative VAS 7.71(0.92) Post-op VAS 77 (1.26)

					2 patients had repeat discectomy and 3 patients had dural suturing for tears.						Combined group data provided by authors
Gadjradj, 2016	Microdiscectomy	Mean (SD) duration symptoms 51.2 (15.3) weeks	N=166 One patient underwent discectomy at 2 levels	One neurosurgical spinal centre, Netherlands	Other possible interventions not reported	VAS LP 0-100mm	Quebec Back Pain Disability Scale (QBPDS) 0-100 (0=normal)	Pre - operative	6 weeks 52 weeks post-surgery	4.8% loss to follow up at 52 weeks: relocating without leaving a forwarding address (n=6), out of the country for extended period (n=1), and death due to an unrelated cause (n=1)	Mean (SD) Pre-operative VAS LP 82.5 (17.3) QBPDS 60.0 (18.4) Six weeks VAS LP 28.8 (24.5) QBPDS 26.7 (20.6) 52 weeks VAS LP 19.6 (23.5) QBPDS 20.2 (18.1)
Gibson, 2017	Transforaminal endoscopic (TED) or microdiscectomy	Median (range) TED: 18 (4–120) MD: 15 (3–120) mths	N=140 n =70 TED n=70 MD	One department of orthopaedics, Edinburgh, Scotland	Physiotherapy was offered for patients with stiffness. Reoperation n=5 PTED and n=2 MD	VAS BP VAS LP 0-10	ODI 1-100	Pre-operative	3 months 1 year 2 years	14% loss to follow up at 3 months 19% losses at 1 year 12% losses at 2 years	Mean (SD) TED Pre-operative VAS BP 5.7 (2.7) VAS LP 6.2 (2.8) ODI 44 (17) 3 months VAS BP 3.0 (2.7) VAS LP 2.8 (2.9) ODI 27(18) 1 year

											VAS BP 3.1 (3.1) VAS LP 2.6 (3.1) ODI 22 (20) 2 years VAS BP 2.5 (2.5) VAS LP 1.9 (2.6) ODI 18 (17) MD Pre-operative VAS BP 4.6 (2.7) VAS LP 5.8 (2.6) ODI 42 (15) 3 months VAS BP 3.1 (2.9) VAS LP 3.2 (3.2) ODI 27 (18) 1 year VAS BP 3.1 (2.7) VAS LP 2.7 (2.8) ODI 22 (19) 2 years VAS BP 3.0 (2.8) VAS LP 3.5 (3.1) ODI 22 (20)
Graver, 1999	Discectomy	Not reported	N=122 (numbers at 1 year follow up?) (n=14 two-level discectomy)	One department of neurosurgery, Oslo, Norway	Other possible interventions not reported	VAS BP VAS LP 0-100mm	None	Pre-operative	1 year 7 years post surgery (mean 7, range 6-7.5)	21.3% at 7 years (n=4 died and n=4 lost)	Mean (SD) Pre-operative VAS BP 55.6 (24.1) VAS LP 61.5 (22.8) 1 year VAS BP 20.8 (24.6) VAS LP 13.5 (22.1) 7 years VAS BP 26.8 (26.4)

											VAS LP 20.0 (25.7)
Guilfoyle, 2007	Lumbar microdiscectomy	Not reported	N=203	Department of neurosurgery, Addenbrookes Hospital UK	11 patients underwent revision surgery Other possible interventions not reported	VAS BP VAS LP	RMDS back RMDS leg	Pre-operative	3 months 12-60 months (median 24 months)	8% Loss to follow up at 3 months and 38% at 12-60 months	Mean (SD) Pre-operative VAS BP: 5.1 (2.85) VAS LP: 6.6 (2.71) RMDS back: 0.2 (7.27) RMDS leg: 11.8 (6.41) 3 months VAS BP: 2.4 (2.46) VAS LP: 2.1 (2.59) RMDS back: 4.2 (5.05) RMDS leg: 3.3 (4.64) 12-60 months VAS BP: 1.7 (2.02) VAS LP: 1.8 (2.36) RMDS back: 3.2 (4.26) RMDS leg: 2.8(4.15) Data from author. SD calculated from SE
Hakkinen, 2003 Hakkinen, 2005	Lumbar disc surgery	Median duration of back pain, months, (IQR) 11 (4,36)	N=173	One hospital in Finland	Other possible interventions not reported	VAS LP & BP (0-10mm)	ODI	Pre-operative	2 months 14 months	16% loss to follow up at 14 months	Median (mm), (IQR) Baseline pain VAS BP: 64 (40,82)

		Median duration of leg pain, months, (IQR) 6 (3,14)									VAS LP: 76 (58,91) 2 months: VAS BP: 12 (3,30) VAS LP: 10 (2,24) 14 months VAS BP: 9 (2,33) VAS LP: 6 (1,32) ODI median (IQR) 2 mths: 14 (4,24) 14 mths: 10 (2,26) No Mean and SD data available
Hussein, 2016	Microdiscectomy (MED) and open discectomy (Open)	Mean duration symptoms, months MED – 4.6 Open – 4.5	N=80 (n=40 MED and n=40 open)	Hospital Egypt with 1 surgeon	MED n=3 required Open procedure (iatrogenic dural tear, recurrence) Open - dural tears n=2. Overall, a total of 10 patients (13.7%) in both groups required revision Surgery. Other possible interventions not reported	NRS LP 0-10 NRS BP 0-10	ODI 0-100	Pre-operative	1 month 6 month 1 year 2 years	8.7% loss to follow up at 2 years	Mean (SD) Pre-operative NRS LP MED 8.8 (0.9) NRS LP Open 8.5 (0.8) NRS BP MED 3.1 (1.1) NRS BP Open 3.1 (0.77) ODI MED 69.4 (10.1) ODI Open 70.8 (6.8) 1 month NRS LP MED 1.4 (0.5) NRS LP Open 1.5 (0.5) NRS BP MED 2.2 (0.5) NRS BP Open 5.9 (0.9)

												ODI MED 22.6 (5.8) ODI Open 52.8 (5.5) 6 month NRS LP MED 1.2 (0.5) NRS LP Open 1.5 (0.5) NRS BP MED 1.8 (0.6) NRS BP Open 4.8 (0.7) ODI MED 20.2 (5.2) ODI Open 46.8 (5.5) 1 year NRS LP MED 1.2 (0.5) NRS LP Open 1.2 (0.5) NRS BP MED 1.6 (0.8) NRS BP Open 3.62 (0.5) ODI MED 19.67 (4.24) ODI Open 35.9 (3.0) 2 years NRS LP MED 1.4 (0.9) NRS LP Open 1.2 (0.7) NRS BP MED 1.6 (0.8) NRS BP Open 3.62 (0.5)
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											ODI MED 19.67 (4.24) ODI Open 34.9 (9.0)
Kahanovitz, 1989	Microdiscectomy and Discectomy	Not reported	N= 63 overall N=30 microdiscectomy (MD) N=34 discectomy (D)	2 surgeons at one hospital in New York, USA	D – n=1 underwent second surgical procedure	NRS 1-10 pain	None	Pre-operative	Follow up MD - Mean FU 17.4 months (range 9-30 months) D- mean FU 18.5 months (range 11-24 months)	Not reported	Mean (SD) Preoperative MD BP 8.03 (3.2) MD LP 8.53 (2.46) D BP 7.56 (3.6) D LP 9.32 (1.7) Follow up MD 57% had no BP MD BP 1.8 (2.6) MD 67% had no LP MD LP 1.3 (2.5) D 74% had no BP D BP 1.09 (2.2) D 74% had no LP D LP 1.09 (2.1)
Kerr, 2015 Lurie, 2014 Pearson, 2012a Pearson, 2012b Weinstein, 2008 SPORT study	Standard open discectomy	Not reported but available	N=521 in observational cohort selecting surgery	13 medical centres with multidisciplinary spine practice in 11 US states	Additional treatments were individualized to the patient by the treating provider(s) and tracked prospectively	Bodily pain score of SF-36 Health Survey 0-100	ODI 0-100	Pre-operative	6 weeks, 3, 6, and 12 months, and annually thereafter	37% loss to follow up at 8 years	Mean (SD) BPS 0-100, where lower figure represents less severe symptoms ODI 0-100, where lower figure represents lower severity Pre op BPS: 77.73 (17.40) ODI: 56.54 (19.04) 6 weeks n=509 BPS: 46.81 (25.11)

											ODI: 23.45 (20.97) 3 months n=471 BPS: 32.08 (24.32) ODI: 18.03 (18.83) 6 months n=421 BPS: 31.23 (25.58) ODI: 16.97 (20.24) 1 year n=467 BPS: 29.32 (24.80) ODI: 16.24(19.34) 2 years n=462 BPS: 29.43 (25.93) ODI: 16.10 (19.82) 3 years n=400 BPS: 28.42 (25.64) ODI: 15.23 (18.60) 4 years n=370 BPS: 26.63 (25.11) ODI: 13.95 (18.83) 5 years n=320 BPS: 28.05 (25.45) ODI: 14.65 (20.24) 6 years n=331 BPS: 26.82 (25.35)
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											ODI: 15.05 (19.39) 7 years n=335 VAS BP: 26.06 (25.29) ODI: 13.97 (19.16) 8 years n=335 VAS BP: 26.96 (25.28) ODI: 13.47 (17.65) Raw data provided by authors and values calculated and check with authors
Kim, 2009	Microdiscectomy	Not reported	N=53	Two departments of neurosurgery, Korea	Other possible interventions not reported.	VAS LP 0-10	ODI	Pre-operative	9 months (unclear paper also makes reference to 1 week and 6 mth follow)	Not reported	Mean (SD) Preoperative VAS LP 9.32 (0.43) (range 7-10 points) ODI 79.82 (4.53) (range 68-92) 1 week VAS LP 1.78 (0.71) ODI 15.27 (3.82)
Kleinstueck, 2011	Discectomy	Not reported	N=308	Spine Tango system and local spine database system	None	VAS 0-10 BP VAS 0-10 LP	COMI 1-10	Pre-operative	12 months	8% lost to follow up at 12 months	Mean (SD) Preoperative VAS LP: 6.9 (2.5) VAS BP: 4.4 (3.0) COMI: 7.8 (1.6) 12 mths VAS LP: 2.6 (2.8) VAS BP: 2.8 (2.7) COMI: 3.4 (2.8)

											Data provided by authors.
Koen, 2017	Discectomy	Not reported	N=92	Orthopaedic department Greece	Other possible interventions not reported	VAS P 0-10	None	Pre-operative	12-14 months	9.8% loss to follow up	Mean (SD) Pre-operative VAS P 5.7 (3.76) 12-14 months VAS P 0.5 (1.68)
Kong, 2016	Microdiscectomy	Mean duration symptoms 3.6 months	N=62	Department of spine surgery China	N=2 required open surgery. Rehabilitation content reported	VAS P (waist and LP)	ODI 0-100	Pre-operative	1 day 1 month 3 months More than 12 months	3.2% loss to follow up at 12 months	Mean (SD) Pre-operative VAS P 7.5 (1.04) ODI 60.14 (6.56) 1 day VAS P 2.5 ODI 9.8 1 month VAS P 2.3 ODI 9.6 3 months VAS P 2.2 ODI 8.8 12 months VAS P 2.0 (0.05) ODI 8.5 (3.26)
Kovacevic, 2017	Lumbar discectomy and microdiscectomy	Not reported	N=111 discectomy N= 56 microdiscectomy	One department of neurosurgery, Serbia	Reoperation at 12 months Discectomy 5.4% Microdiscectomy 3.2% Other interventions not reported	VAS BP VAS LP 0-10	ODI	Pre-operative	3 months 12 months	Losses to follow up not reported	Mean (SD) except 12mths VAS BP (median) Discectomy Pre-operative VAS BP 4.7 (2.2) VAS LP 7.7 (1.9) ODI 58.34 (21.32) 3 months VAS BP 2.1 (2.2) VAS LP 3.0 (2.5) ODI 25.67 (18.43) 12 months VAS BP 2 (1.9) (median)

											VAS LP 2.3 (2.5) ODI 19.13 (15.69) Microdiscectomy Pre-operative VAS BP 4.2 (1.9) VAS LP 8.2 (2.1) ODI 55.1 (19.13) 3 months VAS BP 1.9 (2.0) VAS LP 2.8 (2.3) ODI 22.4 (16.14) 12 months VAS BP 1.60 (2) (median) VAS LP 1.9 (2.5) ODI 14.65 (13.2)
Kuiper, 2002	Discectomy	Not reported	N=67	One hospital, Amsterdam, Netherlands. One neurosurgeon performed all operations	Other possible interventions not reported. Referred to physiotherapy for exercise therapy	VAS BP 100mm VAS LP 100mm	RDQ Scores transformed to 0-100	Pre-operative	3 days (at discharge, no RDQ) 6 weeks post surgery	13% loss to follow up at 3 days 25% losses to follow up at 6 weeks	Mean (+/- 1SEM) Pre-operative VAS BP: 5.5 (2.2) VAS LP: 6.2(2.4) RDQ: 67 (2.8) 3 days VAS BP: 4.7(2.5) VAS LP: 2.1 (1.7) weeks VAS BP: 2.7(2) VAS LP: 2.3(3) RDQ: 36 (3)
Lagerbäck, 2015	Surgery for lumbar disc herniation. Procedure unclear	Duration of back pain <3 mths n=1255 ≥3 mths n=6920 Duration of leg pain	N=10,615 Participants across 3 age groups: ≤18 (n=151) 19–39 (n=4,386)	Swedish Spine Register	Other possible interventions not reported	VAS LP 0-100 VAS BP 0-100	ODI 0-100 (data available from 2000)	Pre-operative	1 year or 2 years Mean follow-up period was 1.8 years	74-80% loss to follow up across groups	Mean (SD) Pre-operative VAS BP: 45.4 (29.2) VAS LP: 66.7 (24.6) ODI: 47.9 (18.6) Post-operative VAS BP: 25.1 (27.0) VAS LP:

		<3 mths n=1620 ≥3 mths n=7009	≥40 years (n=6,078)								22.1 (27.4) ODI: 19 (18.2) Data from author.
Lebow, 2011	Posterior lumbar discectomy	Not reported	N=108	5 institutions USA (5 surgeons)	Other possible interventions not reported	VAS BP 1-10 VAS LP 1-10	ODI 1-100	Pre- operative	6 weeks, 3, 6, 9, 12, and 24 months after surgery Need data – only reported for pre surgery, 6/52 and 2 years	7% Loss to FU 1 year 30% loss FU 2 years	Mean (SD) Pre-operative VAS BP: 4.6 (2.6) VAS LP: 6.4 (2.5) ODI: 49 (15) Six weeks VAS BP: 2.1 (1.9) VAS LP: 1.7 (2.0) ODI: 27 (17) 2-yrs VAS BP: 2.5 (2.3) VAS LP: 2.4 (2.4) ODI: 20(17) No data reported for, 3, 9, and 12 months
Lebow, 2012	Posterior lumbar discectomy	Not reported	N=100	5 institutions USA (5 surgeons)	Other possible interventions not reported	VAS BP 1-10 VAS LP 1-10	None	Pre- operative	6 weeks, 3, 6, 9, and 12 months	No losses to follow up to 1 year stated	Mean (SD) Pre-operative VAS BP: 6.3 (2.5) VAS LP: 6.3 (2.5) 6 weeks VAS BP: 2.1 (2.0) VAS LP: 1.7 (2.0) 3 months VAS BP: 2.1 (1.9) VAS LP: 1.9 (2.1) 6 months VAS BP: 2.3 (2.0) VAS LP: 1.7 (2.1) 9 months VAS BP: 2.0 (1.8) VAS LP: 1.9 (2.2) 12 months

											VAS BP: 2.2 (2.0) VAS LP: 1.9(2.3)
Leinonen, 2003	Microdiscectomy	Not reported	N=20 (n=16 reported)	1 University Hospital in Finland	Other possible interventions not reported	VAS BP 100mm VAS LP 100mm	ODI 1-100	Pre-operative	3 months	20% loss to follow up	Mean (SD) Pre-operative VAS BP: 52.1 (26) VAS LP:48.6 (29) ODI: 35.4 (17) 3 mths: VAS BP: 18.8 (24) VAS LP: 14.7 (21) ODI: 13.8 (15)
Li, 2015	Microdiscectomy	Not reported	N=72	One department of orthopaedics, China	Other possible interventions not reported	VAS BP VAS LP 0-100	ODI	Pre-operative	3 months 6 months 12 months post surgery	None	Mean (SD) Pre-operative VAS BP 23.5 (4.7) VAS LP 76.1 (9.8) ODI 75.6 (9.9) 3 months 14.9 (3.7) 6.8 (3.7) 25.0 (5.0) 6 months 11.4 (3.8) 5.2 (3.5) 20.9 (4.8) 12 months 7.7 (3.9) 4.1 (2.2) 17.2 (4.5)
Li, 2017	Microdiscectomy	Not reported	N=148	Hospital China	N=5 revision surgery for recurrence. Other possible interventions not reported	VAS LP (1-100) VAS BP (1-100)	ODI 0-100	Pre-operative	3 months 6 months 12 months 5 years	9.5% loss to follow up	Mean (SD) Pre-operative VAS BP 26.05 (11.89) VAS LP 75.89 (9.65) ODI 75.27 (9.71)

											3 months VAS BP 7.44 (6.65) VAS LP 3.10 (5.84) ODI 28.51 (5.65) 6 months VAS BP 5.74 (5.83) VAS LP 1.47 (3.56) ODI 20.42 (5.65) 1 year VAS BP 5.04 (7.09) VAS LP 1.16 (3.22) ODI 14.62 (5.51) 5 years VAS BP 5.12 (7.19) VAS LP 0.93 (3.17) ODI 13.83 (4.68)
Liao, 2014	Microdiscectomy	Mean duration of symptoms 5.9 months	N=15	One department of spine surgery, China	Other possible interventions not reported	VAS 0-10	None	Pre-operative	Post-operative Final follow up (1-12 months)	No losses to follow up	Median (range) Pre-operative VAS 7.5 (6.0-9.0) Post-operative 3.0 (1.0-5.0) Follow up 1.5 (0.5-3.0) Requested data from authors; no reply
Lima-Ramirez, 2016	Microdiscectomy (manual percutaneous nucleotomy)	Not reported	N=110	Hospital Mexico	Other possible interventions not reported	NRS P (0-10)	ODI 0-100%	Pre-operative	4 days 30 days 180 days 1 year	No loss to follow up	Mean (SD) Preoperative NRS P 7.75 (1.12)

											ODI 37 (3.06) 4 days NRS P 2.43 (1.88) ODI ? 30 days NRS P 2.05 (2.24) ODI 8.48 (11.72) 180 days NRS P 2.10 (?) ODI 9.33 (13.84) 1 year NRS P 2.14 (2.37) ODI 9.52 (13.92)
Madsbu, 2018 p.581	Microdiscectomy	Not reported	N=5514 N=3907 smokers and n=1607 smokers	Norwegian Registry for Spine Surgery	Complications reported Reoperation n=39 (1%) non-smokers and 26 (1.6%) smokers within 90 days Other interventions not reported	NRS BP NRS LP 0-10	ODI	Pre-operative	1 year	Losses to follow up 30.8% at 1 year	Mean Pre-operative Non-smokers NRS BP 6.0 NRS LP 6.8 ODI 45.1 1 year NRS BP 2.4 NRS LP 1.9 ODI 12.9 Smokers NRS BP 6.4 NRS LP 7.1 ODI 47.1 1 year NRS BP 3.3 NRS LP 2.7 ODI 19.0 Requested SD data from authors; no reply.

Madsbu, 2018 p.1004	Microdiscectomy	Not reported	N=4932 N=4018 non-obese and n=914 obese	Norwegian Registry for Spine Surgery	Complications reported Reoperation n=43 (1.1%) non-obese and 9 (1.0%) obese within 90 days Other interventions not reported	NRS BP NRS LP 0-10	ODI	Pre-operative	1 year	Losses to follow up 31.3% at 1 year	Mean Pre-operative Non-obese NRS BP 6.0 NRS LP 6.8 ODI 45.4 1 year NRS BP 2.6 NRS LP 2.1 ODI 14.0 Obese NRS BP 6.5 NRS LP 7.0 ODI 46.8 1 year NRS BP 2.9 NRS LP 2.3 ODI 16.7 Requested SD data from authors; no reply.
Mannion, 2005	Discectomy	Mean (SD) duration low back pain 4.7 (8.1) years, leg pain 2.5 (5.6) years	N=37 (Study had a comparison group of asymptomatic participants)	University Hospital Zurich, Switzerland	Other possible interventions not reported	0-10 VAS BP VAS LP Average last week. VAS PH (highest) pain last week. VAS PL (Lowest) pain last week. VAS PT (pain today).	RMDQ	1-2 days pre-operative	2 months post surgery	10.8% (n=4) lost to follow up (reasons provided)	Mean (SD) Pre-operative VAS BP 4.1 (2.9) VAS LP 5.7 (2.4) VAS PH 7.3 (2.1) VAS PL 3.6 (2.4) VAS PT 5.0 (2.5) RMDQ 12.7 (6.3) 2 months VAS BP 2.2 (2.1) RMDQ 9.9 (6.2) VAS LP 1.9 (2.2) VAS PH 3.2 (2.6) VAS PL 1.1 (1.5) VAS PT 1.9 (2.1)

McCormick 2016	Percutaneous Lumbar Disc Decompression discectomy	Median 4 months (IQR 2-6)	N=70	1 department USA	Other possible interventions not reported	NRS LP	ODI 0-100	Pre-operative	6 months 1 year 8 years	43% loss to follow up at 1 year 64% loss to follow up at 8 years	Mean (SD) Pre-operative VAS BP 4.69 (3.38) VAS LP 6.90 (2.19) ODI 23.77 (9.91) 6 months VAS BP 2.84 (2.84) VAS LP 2.38 (2.74) ODI 13.56 (10.83) 1 year (n=41) VAS BP 1.85 (2.27) VAS LP 1.78 (2.63) ODI 11.71 (9.73) 8 years (n=25) VAS 2.32 (2.95) ODI 9.08 (10.67) Calculated from raw data
Millisdotter, 2003	Open or microscopic technique	Mean duration of leg pain 12 months (range 2–60 months)	N=71	University Hospital, Sweden and the Department of Orthopedics, Helsingborg Hospital Sweden	All patients received physiotherapy training after surgery, beginning 2-6 weeks after surgery	VAS BP 100mm VAS LP 100mm	RMDQ	Pre-operative	6 weeks 4 months 12months	18.3% loss to follow up	Mean (SD) Baseline: VAS BP: 36 (28) VAS LP: 59 (26) RMDQ: 14.4 (5.3) 6 weeks: VAS BP: 11 (13) VAS LP: 15 (19) RMDQ: 8.8 (5.0) 4mths: VAS BP: 13 (19) VAS LP: 13 (20) RMDQ: 4.7 (4.9) 12mths: VAS BP: 12 (19)

											VAS LP: 12 (18) RMDQ: 4.3 (4.8)
Ng, 2004	Lumbar discectomy	Mean duration (range) of symptoms 11 months (2 to 60)	N=113	All operations were performed by one surgeon at Leicester General Hospital, England	Other possible interventions not reported	VAS LP 1-10	ODI	Pre-operative	1 year	9% loss to follow up at 1 year	Mean (SD) Pre-operative VAS LP: 7.40 (1.64) ODI: 54.86 (20.20) 1 year VAS LP: 2.96 (2.90) ODI: 20.22 (20.19)
Nie, 2016	Percutaneous interlaminar (PEID) or transforaminal (PETD) endoscopic discectomy	Not reported	N=60 PEID n=30 PETD n=30	Department of orthopaedics China	Other possible interventions not reported	VAS P (waist and LP)	ODI 0-100	Pre-operative	24 to 37 months (mean, 27.7 months)	Loss to follow up not reported	Mean (SD) Preoperative PEID VAS P 7.90 (1.42) PETD VAS P 7.60 (1.40) ODI PEID 59.0 (16.0) ODI PETD 60.1 (13.7) Last follow up PEID VAS P 2.20 (1.37) PETD VAS P 2.30 (1.02) ODI PEID 20.4 (7.7) ODI PETD 22.0 (9.1)
Ohtori, 2010	Lumbar posterior discectomy	Mean symptom duration 6 months (4-12 months normal)	N=45 N=22 normal group N=22 modic type 1 group	One Department of Orthopaedic Surgery in Japan	Other possible interventions not reported. No further surgery done	VAS BP 0-10 VAS LP 0-10	ODI	Pre-operative	1 year 2 years	No reported losses to follow up	Means (SD where available) Pre-operative VAS BP 6.8 (1.9) (normal) 6.4 (2.3) (modic) VAS LP:

		group, 3-24 months modic group)									7 (1.5) (normal) 6.5 (1.3) (modic) ODI: 52 (10) (normal) ODI: 46 (11) (modic) 1 year VAS LP: 2.2 (normal) 2.4 (modic) ODI 23 (normal) ODI 16 (modic) 2 years VAS BP 1.8 (0.9) (normal) 1.4 (0.8) (modic) VAS LP: 1.5 (0.5) (normal) 1.9 (1.0) (modic) ODI: 12 (5) (normal) ODI: 16 (5) (modic)
Okoro, 2010	Discectomy	Not reported	N=53 participants operated at L45 level N=77 participants operated at L5S1 level	One orthopaedic and trauma centre, UK	Other possible interventions not reported	VAS	ODI	Pre-operative	Up to 56 months post surgery	None as only participant with complete data included	Mean Pre-operative VAS L45 7.7 VAS L5S1 7.5 ODI L45 56.6 ODI L5S1 58.2 After 6 months follow up VAS L45 2.84 VAS L5S1 3.69 ODI L45 20.1 ODI L5S1 26.4 No SD available

Overdevest , 2017	Open Microdiscectomy or minimal invasive discectomy with tubular retractors	Mean (SD duration LP 29.2 (47.4) tubular group & 27.8(23.3) convention al group	N=325 N=166 randomised to tubular discectomy & n=159 to conventional microdiscect omy	Five neurosurge ry centres in the Netherland s	Complication s reported Reoperation Reoperation at 5 years was 18% tubular group and 13% conventional group Other interventions not reported	VAS BP VAS LP 0-100	RMDQ 0-23	Pre- operative	2, 4, 6, 8, 12, 26, 38, 52, 78, 104, 156, 208 and 260 weeks	Losses to follow up 29% at 12 months in tubular group and 33% in convention al group	Mean (SD for baseline) Conventional Baseline VAS BP 38.3 (27.8) VAS LP 61.7 (24.0) RMDQ 16.3 (4.3) 8 weeks VAS BP 18.0 VAS LP 12.8 RMDQ 4.9 52 weeks VAS BP 17.3 VAS LP 11.5 RMDQ 3.4 104 weeks VAS BP 19.3 VAS LP 14.0 RMDQ 3.7 156 weeks VAS BP 21.5 VAS LP 15.0 RMDQ 3.7 208 weeks VAS BP 22.3 VAS LP 16.0 RMDQ 4.0 260 weeks VAS BP 19.9 VAS LP 13.7 RMDQ 3.4 Tubular Baseline VAS BP 40.2 (27.0) VAS LP 62.6 (21.1)
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											RMDQ 16.0 (4.4) 8 weeks VAS BP 21.8 VAS LP 17.2 RMDQ 5.8 52 weeks VAS BP 22.5 VAS LP 16.0 RMDQ 4.7 104 weeks VAS BP 23.5 VAS LP 15.2 RMDQ 4.5 156 weeks VAS BP 20.0 VAS LP 14.4 RMDQ 3.9 208 weeks VAS BP 21.6 VAS LP 15.6 RMDQ 3.9 260 weeks VAS BP 20.3 VAS LP 13.9 RMDQ 4.3 Requested SD data and data for all time points from authors; no reply.
Parker, 2015	Lumbar discectomy	Not reported	N=112 in initial population N=103 included (i.e. had data in database at	One institution in USA	Other possible interventions not reported	NRS-BP NRS-LP	ODI	Pre-operative	3 months 1 year 2 years	9.2% loss to follow up at 1 year 14.3% losses at 2 years	Mean (SD) Pre-operative ODI: 52.16 (18.42) NRS BP: 5.56 (3.39) NRS LP: 7.49 (2.35)

			1 year) and included N=35 followed up past 2 years N=30 were available for 2 year outcomes								3 months ODI: 17.30 (17.26) NRS BP: 2.22 (2.51) NRS LP: 2.11 (2.82) 1 year ODI: 17.65 (18.56) NRS BP: 2.88 (2.82) NRS LP: 2.51 (3.14) 2 years ODI: 19.33 (20.42) NRS BP: 2.90 (3.12) NRS LP: 2.21 (3.11)
Peng, 2010	Percutaneous endoscopic discectomy	Not reported	N=55	One department of orthopaedic surgery in Singapore Operations performed by 2 surgeons	2 patients open discectomy 1 prolapse managed conservatively 3 patients fusion 1 patient washout	VAS BP 10 VAS LP 10	NASS	Pre-operative	6 months 2 years	No reported losses to follow up	Means Pre-operative VAS BP: 7.6 VAS LP: 8.2 NASS: 3.1 6 months VAS BP: 3.1 VAS LP: 2.8 NASS: 2 2 years VAS BP: 2 VAS LP: 1.3 NASS: 1.7 No SD data available
Porchet, 2009	Discectomy or microdiscectomy	Not reported	N=261	Data of	Other possible	VAS 0-10 BP	None	Pre-operative	3 months 12 months	Data missing for	Means (SD) Baseline

			patients on the database satisfied the inclusion criteria (225 microdiscectomy, 36 standard discectomy)	all patients undergoing surgery 6 experienced spine surgeons (4 ortho and 2 neuro) in the Spine Center of a specialised orthopaedic hospital in Switzerland Data collected through Spine Tango Spine Surgery Registry	interventions not reported	VAS 0-10 LP COMI Questionnaire 0-10				13% at baseline, 5% at 3 months, and unclear re data missing at 12 months	VAS BP: 4.4 (2.7) (discectomy) 4.5 (2.9) (microdiscectomy) VAS LP: 7.6 (1.7) (discectomy) 6.9 (2.5) (microdiscectomy) 3 months VAS BP: 2.3 (2.1) (discectomy) 2.4 (2.4) (microdiscectomy) VAS LP: 2.9 (2.5) (discectomy) 2.4 (2.5) (microdiscectomy) 12 months VAS BP: 2.4 (2.1) (discectomy) 2.6 (2.6) (microdiscectomy) VAS LP: 2.1 (2.6) (discectomy) 2.5 (2.7) (microdiscectomy)
Ramberg, 2001	Automated percutaneous lumbar discectomy	Not reported	N=26	1 department of orthopaedics in Sweden	10 patients required open revision surgery	VAS LP VAS BP	ODI	Pre-operative	VAS day 1 post op All measures: 1 week 2 weeks 3 weeks 6 weeks	15% loss to follow up (2-5 year)	Median (IQR) Pre op VAS LP: 55 (39-80) VAS BP: 50 (14-76) ODI: 54 (32-61) 1 day

									2-5 years		VAS LP: 34 (4-54) VAS BP: 34 (6-53) ODI: 55 (38-65) 1 week VAS LP: 19 (7-70) VAS BP: 32 (7-74) ODI: 58 (42-70) 2 weeks VAS LP: 49 (10-76) VAS BP: 35 (8-72) ODI: 51 (39-66) 3 weeks VAS LP: 28 (5-73) VAS BP: 22 (6-50) ODI: 52 (39-60) 6 weeks VAS LP: 20 (4-77) VAS BP: 21 (7-73) ODI: 49 (30-65) 2-5 years VAS LP: 5 (2-40) VAS BP: 8 (3-41) ODI: 16 (7-37) Data extracted from figures
Ren, 2017	Microdisectomy	Mean duration 15.5 months (range, 4 months to 9 years)	N=26	One department of orthopaedics, China	Further surgery n=1 Other interventions not reported	VAS BP VAS LP 0-10	ODI	Pre-operative	Post op (1 week) 3 months 12 months	No losses to follow up	Mean (SD) Pre-operative VAS BP 6.86 (1.33) VAS LP 8.39 (1.84) ODI 83.63 (8.49)

											Post-operative VAS BP 2.65 (1.50) VAS LP 2.18 (1.26) ODI 23.58 (7.24) 3 months VAS BP 2.14 (0.73) VASLP 1.96 (0.83) ODI 19.81 (11.26) 12 months VAS BP 2.28 (1.13) VAS LP 2.05 (1.42) ODI 17.54 (13.40)
Righesso, 2012	Microdiscectomy	Mean duration of symptoms 2months	N=150	1 orthopaedic department in Brazil	Other possible interventions not reported	VAS pain 0-10	ODI	Pre-operative	1, 3, 6, 12, and 24 months after surgery	<1% loss to follow up from 6 months onwards	Median (IQR) Pre-operative VAS: 9 (8-10) ODI: 48 (38-59) 1 month VAS: 1 (0-2) ODI: 12 (10-20) 3 months VAS: 0 (0-1) ODI: 10 (8-14) 6 months VAS: 0 (0-1) ODI: 10 (8-12) 12 months VAS: 0 (0-1) ODI: 10 (8-12) 24 months VAS: 0 (0-1) ODI: 10 (8-12)
Ruetten, 2008	Microdiscectomy	Duration of pain	N=200	Unclear number of	Revision surgery	VAS BP 0-100	ODI	Pre-operative	3 months 6 months	3.5% loss to follow up	Mean (group) Pre-operative

	Randomised for operation procedure MI – conventional FE – full endoscopic	ranged from 1 day to 16 months (mean, 82 days)	N=100 MI N=100 FE	clinics in Germany. 2 surgeons	reported for 11% patients, including 6 patients with fusion. Other possible interventions not reported	VAS LP 0-100			12 months 24 months	at 3 months, 5.5% at 6 months, 7.5% at 12 months and 11% at 24 months	VAS LP: 71(MI) 75(FE) VAS BP: 15(MI) 19(FE) ODI: 73(MI) 75(FE) 3 months VAS LP: 9(MI) 6(FE) VAS BP: 20(MI) 15(FE) ODI: 26(MI) 22(FE) 6 months VAS LP: 7(MI) 9(FE) VAS BP: 22(MI) 16(FE) ODI: 24(MI) 21(FE) 12 months VAS LP: 11(MI) 9(FE) VAS BP: 19(MI) 17(FE) ODI: 23(MI) 19(FE) 24 months VAS LP: 9(MI) 8(FE) VAS BP: 18(MI) 11(FE) ODI: 24(MI) 20(FE) No SD data available
Sahlstrand, 1999	Automated percutaneous	Not reported	N=20	Unclear number of	7 patients required	VAS BP 0-100	None	Pre-operative	Day 1 1 week 6 weeks	No reported losses to follow up	Median (IQR) Pre-operative

	lumbar discectomy			clinics in Sweden	further surgery Other possible interventions not reported	VAS LP 0-100					VAS BP: 28 (13-76) VAS LP: 57 (43-83) Day 1 VAS BP: 28 (15-52) VAS LP: 41 (5-62) 1 week VAS BP: 37 (7-64) VAS LP: 33 (7-83) 6 weeks VAS BP: 8 (5-56) VAS LP: 26 (0-90) Data extracted from figures
Sasani, 2007	Percutaneous endoscopic discectomy	Not reported	N=66	1 neurosurgical department in Turkey	4 patients had physical therapy & brace, 5 had reoperation	VAS	ODI	Pre-operative	Day 7 6 months 12 months	No reported losses to follow up	Mean (range) Pre-operative VAS: 8.2 (7-10) ODI: 78.2 (70-98) Day 7 VAS: 4.2 (3-6) ODI: 38.2 (26-52) 6 months VAS: 1.4 (0-4) ODI: 12.4 (0-18) 12 months VAS: 1.2 (0-2) ODI: 8.0 (0-12) No SD available
Schick, 2009	Microdiscectomy	Mean duration of symptoms 6.03 weeks	N=100 Also included n=100 patients with sequestrect	1 department of neurosurgery in Germany 6 surgeons	2 required re-operation on day 3 Other possible interventions not reported	VAS BP 0-10 VAS LP 10	ODI	Pre-operative	Post op follow up median 35.4 months	55% loss to follow up	Mean Pre-operative VAS LP: 8.36 VAS BP: 7.81 ODI – not reported Follow up VAS LP: 3.3

			omy only as comparison								VAS BP: 3.7 ODI: 44.18 No SD available
Schizas, 2005	Microdiscectomy and discectomy cohorts	Average duration of symptoms 12.1 (range 7–20) weeks (MED) and 12.8 (range 6–22) weeks (MSD)	N=14 microdiscectomy (microendoscopic discectomy [MED]) N=14 discectomy (microsurgical discectomy [MSD])	Unclear	None	None	ODI 0-100	Pre-operative	Post surgery follow up for an average of 12 (range 11–29) months	Not reported	Mean Pre-operative ODI MED 65 ODI MSD 64 Postoperatively ODI MED 22.3 ODI MSD 15 Authors contacted no SD provided
Sharma, 2013	Discectomy	Not reported	N=50	Unclear detail of hospital in Russia	Other possible interventions not reported	VAS pain 1-10	mODI	Pre-operative	10-12 days post-operative	No loss to follow up	Mean (SD) Pre-operative VAS 7.1 (2.1) Post surgery VAS 2.9 (2.3) Data provided for subsections, but unable to include as not compatible with other ODI data
Shawky Abdelgawad, 2017	Discectomy	Mean duration of symptoms was 12.5 weeks (range 1–13 weeks)	N=76	One surgeon in 1 spine centre in Germany	Complications reported. 13.8% reoperation rate for recurrence Other interventions not reported	VAS BP VAS LP 0-10	ODI	Pre-operative	Post-operative at discharge Final follow up period ranged from 12 months to 54 months,	Losses to follow up not reported	Mean Pre-operative VAS BP 2.5 VAS LP 7.6 ODI 42.0 Post-operative at discharge VAS BP 1.3 VAS LP 1.4 ODI 12.3 Final follow up

									with a mean of 38 months		VAS BP 1.0 VAS LP 1.2 ODI 10.0 Requested SD data from authors; no reply
Silverplats, 2010	Discectomy or microdiscectomy	Not reported	N=171	Unkown number of clinics in Sweden and Iceland	16 patients underwent further surgery Other possible interventions not reported	VAS LP VAS BP (Mean of 3 VAS 0-100 – worse pain, least pain, pain now)	ODI 0-100	Pre-operative	2 years Long term follow up mean 7.3 (1.0) years	18% lossto follow up at 2 years 20% at long term follow up	Mean (SD) Baseline VAS LP: 59 (19) VAS BP: 50 (23) ODI: 52 (90) 2 years VAS LP: 24 (24) VAS BP: 26 (24) ODI: 20 (78) Long term VAS LP: 17 (22) VAS BP: 18 (19) ODI: 16 (68)
Solberg, 2005	Microdiscectomy	Not reported	N=228	All patients from 1 department of neurosurgery in Norway	Other possible interventions not reported	VAS BP 100mm VAS LP100mm	ODI 0-100	Pre-operative	12 months	21% loss to follow up at 12 months	Mean (SD) 95%CI Pre-operative VAS BP: 51.7 (29.3) 47.4–56.0 VAS LP: 63.4 (27.5) 59.3–67.4 ODI: 49.5 (21.2) 46.4–52.6 12 months VAS BP: 21.3 (22.6) 18.0–24.6 VAS LP: 16.8 (21.1) 13.7–20.0 ODI: 13.4 (13.0) 11.4–15.3
Solberg, 2013	Surgery for lumbar disc herniation	Not reported	N=894	16 surgical units contributing data to	Other possible interventions not reported	NRS BP 0-10 NRS LP 0-10	ODI 0-100	Pre-operative	12 months	894 patients eligible but the n=692	Mean (SD) Baseline NRS BP: 6 (3) NRS LP: 7 (2)

				Norwegian Registry for Spine Surgery						who returned the 12 month questionnaire were included (4 with incomplete data) Losses of 23%	ODI: 46 (18) 12 months NRS BP: 3.0 (2.6) NRS LP: 2.41 (2.64) ODI: 17.6 (16.7)
Sorlie, 2012	Microdiscectomy	Not reported	N=241 Group 1: With modic changes Group 2: No modic changes	1 neurosurgery department in Norway	Other possible interventions not reported	VAS BP 100mm VAS LP 100mm	ODI 0-100	Pre-operative	1 year	26% loss to follow up at 1 year	Mean (SD) [group] Baseline VAS BP 50.0 (18.6) [I] 49.0 (28.2) [II] VAS LP 56.1 (28.2) [I] 62.0 (25.6) [II] ODI 43.0 (17.2) [I] 45.5 (20.5) [II] 1 year VAS BP 34.0 (50.0) [I] 11.5 (32.0) [II] VAS LP 8.0 (30.0) [I] 6.0 (36.0) [II] ODI 18.0 (23.5) [I] 10.0 (20.5) [II] Assume mean (SD). No reply from author.

Sun, 2014	Discectomy	Not reported	N=38 (a further cohort underwent fusion also)	1 orthopaedic department in China 5 senior surgeons	Other possible interventions not reported	VAS BP VAS LP	ODI (assumed scored out of 50)	Pre-operative	1 month 3 months 6 months 1 year	No reported losses to follow up	Mean (SD) Pre-operative VAS BP: 4.5 (2.9) VAS LP: 6.5 (2.5) ODI: 21.5 (10.8) 1 month VAS BP: 1.3 (1.7) VAS LP: 1.1 (1.6) ODI: 20.1 (9.4) 3 months VAS BP: 0.7 (1.1) VAS LP: 0.9 (1.4) ODI: 8.2 (7.7) 6 months VAS BP: 0.5 (1.2) VAS LP: 0.6 (1.3) ODI: 3.5 (4.2) 1 year VAS BP: 0.5 (1.0) VAS LP: 0.3 (0.9) ODI: 2.7 (3.8) Assumed ODI scored out of 50
Thaler, 2012	Sequesterectomy or subtotal discectomy dependent upon findings at surgery	Not reported	N=46 N=23 left sided radiculopathy N=23 right sided radiculopathy	Unclear number of clinics in Austria	Other possible interventions not reported	VAS BP 0-10 VAS LP 0-10	None	Pre-operative	Day of discharge (day 3) 5 weeks	No reported losses to follow up	Median (IQR) Pre-operative VAS BP: 4 (5) (left) 4 (5) (right) VAS LP: 3 (4)(left) 5 (3) (right) Discharge VAS BP 3 (4) (left) 0 (2) (right) VAS LP 0 (5) (left) 0 (1) (right) 5 weeks

											VAS BP 0 (2) (left) 0 (0) (right) VAS LP 0 (2) (left) 0 (1) (right)
Than, 2016	Discectomy	Not reported	N=148	13 academic and community sites contributing to NeuroPoint -SD registry	Other possible interventions not reported	VAS BP 0-10	ODI 1-100	Pre- operative	1, 3, 6, and 12 months	Loss to follow up: 5.4% at 1 month 14.2% at 3 month 16.9% at 6 months 16.7% at 1 year	Mean (SEM) Pre-operative VAS 7.1 (0.6) ODI 56.3 (4.3) 1 month VAS 3.8 (0.6) ODI 35.6 (4.3) 3 month VAS 3.4 (0.6) ODI 29.9 (4.2) 6 months VAS 3.1 (0.6) ODI 27.4 (4.2) 12 months VAS 3.1 (0.6) ODI 25.2 (4.2)
Toyone, 2004	Discectomy or microdiscectomy	Mean (SD) duration of back pain before surgery 17 (30.5) months	N=40 First n=20 discectomy Second n=20 microdiscectomy	1 department of orthopaedic surgery in Japan	Drug management and surgical intervention reported Other possible interventions not reported	VAS BP 100mm VAS LP 100mm	NASS questionnaire	Pre- operative	1 month 3 month intervals for 1 year Then 6 month intervals Mean duration follow up 40 months (range 24- 54)	No losses to follow up	Mean (SD) Pre-operative VAS LP: 87.3 (10.5) VAS BP: 51.5 (32.0) Final follow up VAS LP: 8.4 (8.4) VAS BP: 10.4 (9.9)
Tschugg, 2017	Microdiscectomy	Mean (SD) duration of pain in days	N=52 Two groups:	Department of neurosurgery Austria	All patients received post op rehab starting at 4	VAS P 0-10	ODI 1-100	Pre- operative	Within 1 week 6 months 12 months	1.9% loss to follow up at 6 months 3.8% loss	Mean (SD) Pre-operative NS VAS P 2.5 (1) S VAS P 2.5 (1)

		NS 130 (288) S 182 (230)	regular physical activity S; n = 26 no exercise NS; n = 26		weeks x 8 sessions.					to follow up at 12 months. NS recurrent disc herniation n=9 (23%) S recurrent disc herniation n=3 (11.5%) Accidental durotomy n=1 in group NS. All excluded.	NS ODI 38.3 (17) S ODI 36.5 (17) 1 week NS VAS P 1.0 (0) S VAS P 1.0 (0) NS ODI 26.8 (18) S ODI 25.3 (15) 6 months NS VAS P 1.0 (0.8) S VAS P 0.5 (0.8)? NS ODI 11.9 (11) S ODI 5.0 (6) 12 months NS VAS P 0.8 (0) S VAS P 0.6 (0) NS ODI 11.1 (10) S ODI 6.0 (8)
Tullberg, 1994	Discectomy or microdiscectomy depending on surgeon preference	Not reported	N=40	1 department of orthopaedics in Sweden 1 surgeon	Other possible interventions not reported	VAS BP 0-10 VAS LP 0-10 (right and left leg)	None	Pre-operative	1 year	10% Loss to follow up	Mean (SD) Pre-operative VAS LP (Right): 3.03 (3.39) VAS LP (Left): 4.67 (3.18) VAS BP: 3.89 (2.09) Final follow up VAS LP (Right): 1.19 (2.27) VAS LP (Left): 1.22 (1.92) VAS BP: 2.08 (2.38) Mean and SD calculated from raw data

Veresciagina 2010	Microdiscectomy and open discectomy	Duration back pain 83 ± 11 (min 0.25–max 360) Duration leg pain 7 ± 1 (min 0.25–max 84)	N=100	1 University department of neurosurgery in Lithuania	Other possible interventions not reported	VAS BP VAS LP	ODI	Pre-operative	6 months 1 year 2 years 3 years 4 years	Losses to follow up unclear	Mean (SD) Pre-operative ODI: 60 (20) VAS LP: 8.5 (1.0) 6 months ODI: 32 (60) VAS LP: 2.2 (4.0) 1 year ODI: 26 (40) VAS LP: 2.6 (3.0) 2 years ODI: 27 (80) VAS LP: 1.2 (1.0) 3 years ODI: 32 (50) VAS LP: 2.5 (4.0) 4 years ODI: 33 (80) VAS LP: 2.7 (5.0) Data extracted from figures for leg pain. SD calculated from SE
Wallbom, 2009	Discectomy	Mean (SD) duration of pain 14 (11) months	N=17 patients	One spinal centre, USA	Other possible interventions not reported	100mm VAS Pain (highest [H], lowest [L] and average [A] past week)	Quebec back pain disability scale (QBPDS) (0-100)	Pre-operatively Mean (SD) time before surgery 10.5 (3.9) days	30 days post surgery Mean (SD) time post surgery 4.7 (0.8) weeks	No losses to follow up	Mean (SD) Pre-operative VAS H 78.1 (13.9) VAS L 37.4 (16.4) VAS A 59.1 (10.9) QBPDS 56.8 (16.3) Post surgery VAS H 12.1 (7.8) VAS L 1.5 (2.1) VAS A 5.4 (5.2) QBPDS 21.1(18.8)

											QBPS data provided by authors
Xu, 2014	Microdiscectomy	Mean (SD) duration symptoms: a 11.61 (2.94) b 14.06 (6.27) c 12.67 (3.16)	N=36 Divided into 3 groups re timing of surgery a, b and c	One department of orthopaedics, China	Other possible interventions not reported	VAS LP VAS BP 0-100	None	Pre-operatively	3 months 12 months	5.5% (n=2) lost to follow up	Mean (SD) Pre-operative VAS LP a 74.92 (4.30) b 75.08 (2.02) c 75.50 (2.24) VAS BP a 20.25 (3.93) b 20.58 (4.12) c 18.92 (2.71) 3 months VAS LP a 11.17 (2.92) b 9.92 (2.39) c 8.08 (1.44) VAS BP a 7.42 (2.35) b 6.50 (1.62) c 8.42 (2.15) 12 months VAS LP a 8.25 (3.08) b 7.25 (1.71) c 7.92 (1.62) VAS BP a 7.08 (2.11) b 6.83 (1.47) c 6.33 (1.37)
Yadav, 2013	Microdiscectomy	Not reported	N=400	1 department of neurosurgery in India 1 surgeon	2 patients underwent re-operation Other possible interventions not reported	VAS BP 0-10 VAS LP 0-10	None	Pre-operative	3 months 6 months 12 months	Loss to follow up unclear Mean follow up 2 years (range 10	Mean Pre-operative VAS: 7.9 3 months: VAS:1.3 No SD reported and no separated

										months to 5 years)	scores for BP and LP reported
Yeom, 2011	Microdiscectomy (new technique for 12/353 patients)	Mean duration of symptoms 67 days (range 2 days to 13 months)	N=12	Two orthopaedic centres, Republic of Korea	Other possible interventions not reported	VAS BP VAS LP	None	Pre-operative	1 week 4 weeks 3 months 1 year - final follow-up (mean 25, range 12–28 months)	No losses to follow up	Mean (range) Pre-operative VAS BP 6.8 (2.4–9.1) VAS LP 8.2 (6.3–9.6) 1 week VAS BP 2.6 VAS LP 2.4 4 weeks VAS BP 2.2 VAS LP 2.3 3 months VAS BP 1.6 VAS LP 1.9 1 year VAS BP 1.5 (0.5–3.4) VAS LP 1.4 (0.0–2.8) No SD available
Ying, 2016	Microdiscectomy A - modified approach (transforaminal approach via superior margin of inferior pedicle) B - Classic approach (Kambin transforaminal approach)	Mean (SD) duration of symptoms, months A 4.5 (3.3) B 4.1 (4.0)	N=45 Group A N=22 Group B n=23	Department of spine surgery China	Other possible interventions not reported	VAS LP 0-10	ODI 1-100	Pre-operative	1 month, 3 months, 6 months, and 1 year after surgery.	8.7% loss to follow up in group B	Mean (SD) Pre-operative A VAS LP 5.95 (1.33) B VAS LP 6.30 (1.72) A ODI 55.44 (14.73) B ODI 59.51 (16.96) 1 year A VAS LP 1.05 (0.90) B VAS LP 1.30 (0.82)

											A ODI 12.42 (6.98) B ODI 13.91 (6.27) Incomplete data reported.
Yoon, 2012	Discectomy or microdiscectomy	Mean duration radiculopathy 1.8 months (group I) 2.79 months (group II)	N=72 Group I n=37 underwent discectomy using PELD Group 2 n=35 patients underwent discectomy using METRx-MD	1 department of neurosurgery in Korea	1 patient revision surgery Other possible interventions not reported	VAS BP VAS LP	ODI	Pre-operative	6 weeks, 3, 6, 9, 12, and 24 months after surgery	Losses to follow up were 49-68% group I and 29-49% in group II (pre-operative to 3 months)	Mean Group I Pre-operative VAS BP: 4.57 VAS LP: 4.57 ODI: 46.15 , 6 weeks VAS BP: 1.75 VAS LP: 2.25 ODI: 17.83 3 months VAS BP: 1.54 VAS LP: 1.77 ODI: 13.71 Group II Pre-operative VAS BP: 5.18 VAS LP: 7.13 ODI: 56.4 6 weeks VAS BP: 2.11, VAS LP: 1.52 ODI: 29.5 3 months VAS BP: 2.55 VAS LP: 2.11 ODI: 26.5 No SD available. No data 6 months onwards as combined

