

Appendix 2 Study characteristics

Study	N	Inclusion criteria		Mean age (SD)	Mean pain score (SD)	Intervention	Control	Funding
RD of the facet joints								
Gallagher 1994	41	Low back pain >3 months duration with symptoms typical of facet joint pain	Improvement (n=30) or equivocal (n=11) response to anaesthetic block	NR	VAS RD 5.8 (1.78); Sham 7.2 (1.94)	Nerves above and below painful joint denervated at 80° for 90 seconds.	Nerves also identified with stimulation but no heat lesion made	NR
Juch 2017	251	Low back pain without response to conservative management and considered to be related to the facet joint	Positive response to anaesthetic block (reported 50% pain relief 30-90 minutes after block)	RD 53.0 (11.5); Control 52.6 (10.8)	NRS RD 7.14 (1.38) Control 7.19 (1.29)	Denervation at 90° for 90s of L3-4, L4-5 or L5-S1 with exercise program	Exercise program	The Netherlands Organization for Health Research and Development, by the Dutch Society for Anesthesiology, and the Dutch health insurance companies
Leclaire 2001	70	Low back pain for >3 months	“Significant” relief of back pain for >24h following facet injections	RD 46.7 (9.3); Sham 46.4 (9.8)	VAS RD 5.19 (2.67); Sham 5.15 (2.08)	RD with fluoroscopic guidance at 80°C for 90s of at least 2 levels	Nerves also identified with stimulation but electrode only heated to 37°C	Institut de recherche en sante´ and se´curite´ du travail du Que´bec
Moussa 2016	80	Low back pain for >1 year without response to conservative management	Complete or near complete reduction of CLBP on VAS 30 min after 2	RD capsule 58.1 (NR); RD conventional 56.5 (NR);	VAS RD 8.22 (NR); Sham 7.83 (NR)	RD of facet capsule on medial and lateral aspect or	Same procedure without elect current turned on	No funding received

			injections separated by >2 weeks	Sham 55.9 (NR)		conventional RD at 85°C for 90s		
Nath 2008	40	Low back pain for >2 years, not responded to previous treatment, pain attributable to lumbar facet joints	80% pain relief on 3 medial branch blocks	56 (range, 36–79)	VAS RD 5.98 (NR); Sham 4.38 (NR)	RD at 85°C for 60s with additional lesions just lateral and medial to the target nerve	Same procedure as RD but electrode tip remained at body temperature	No funding received
Tekin 2007	40	Back pain for >6 months with focal pain over the facet joints and unresponsive to conservative treatments	>50% reduction in VAS pain 30 minutes after diagnostic medial branch block	RD 60.5 (8.5); Sham 57.9 (9.3)	VAS RD 6.5 (1.5); Sham 6.8 (1.6)	RD at same levels as diagnostic blocks at 80°C for 90s.	Same procedure as RD but with current switched off	Not reported
Van Kleef 1999	32	Low back pain of >12 months duration, failure of conservative management	>50% reduction in pain following diagnostic nerve block of L3-L5 Baseline VAS score of >4	RD 46.6 (7.4); Sham 41.4 (7.5)	VAS RD 5.2 (1.7); Sham 5.2 (1.6)	RD at 80°C for 60s	Same procedure as RD but with current switched off	The Nederlandse organisatie voor wetenschappelijk
Van Tilburg 2016	60	Low back pain for >3 months and failure of conservative management	Decrease of >2 on medial branch block	RD 65 (12); Sham 58 (12)	NRS RD 7.2 (1.4); Sham 7.4 (0.8)	RD at 80°C for 60s per level for three steps with physiotherapy	Same procedure as RD but with current switched off with physiotherapy	No funding from a commercial party
Van Wijk 2005	81	Low back pain for >6 months	≥50% reduction on	RD 46.9 (11.5);	VAS RD 5.8 (1.8);	RD 80°C for 60 seconds	Same procedure as	Grant from the Dutch Health

			diagnostic block	Sham 48.1 (12.6)	Sham 6.5 (1.8)	at the levels concerned	RD but with current switched off	Insurance Council
RD of the sacroiliac joints								
Cohen 2008	28	Axial low back or buttock pain ≥ 6 months, tenderness overlying the sacroiliac joint(s), failure to respond to conservative therapy	≥ 75% pain relief for ≥3h following diagnostic sacroiliac joint injection, but back near baseline within 2 months	RD 51.9 (13.6); Sham 51.8 (13.1)	VAS RD 6.1 (1.8); Sham 6.5 (1.9)	RD 80°C for 90 seconds using cooling probe technology (Cooled RD)	Same procedure as RD but no current applied	John P. Murtha Neuroscience and Pain Institute, the Army Regional Anesthesia & Pain Medicine Initiative, and National Institutes of Health grant # MH075884
Juch 2017	228	Low back pain without response to conservative management, considered to be related to the sacroiliac joint.	Positive response to anaesthetic block (reported 50% pain relief 30-90 minutes after block)	RD 51.6 (10.9); Control 51.1 (12.2)	NRS RD 7.17 (1.65); Control 7.06 (1.43)	RD - 60° for 2.5 min per lesion of S1, S2 and S3 with exercise program	Exercise program	The Netherlands Organization for Health Research and Development, by the Dutch Society for Anesthesiology, and the Dutch health insurance companies
Mehta 2018	17	CLBP for >6 months. >5 on NRS	>80% pain reduction on 2 diagnostic blocks	RD 56.6 (NR); Sham 62.6 (NR)	VAS RD 8.1 (0.8); Sham 7.3 (0.8)	RD of the L5 medial branch of the primary dorsal root nerve and strip lesioning of the lateral branches	Identical to active RD treatment except that no RF energy was applied	None

Patel 2012	51	Pain for ≥6 months, 3-day average NRS between 4 and 8, failure of conservative management	≥75% pain reduction for 4h-7 days on two sets of anaesthetic blocks and back to baseline by start of the study	RD 56 (15); Sham 64 (14)	NRS RD 6.1 (1.3); Sham 5.8 (1.3)	of the S1, 2, and 3 nerve roots RD at 60°C for 150s of L5 dorsal ramus and then acral lateral branches of S1, S2 and S3 (cooled RD)	Same procedure as RD but RF energy was not delivered.	Baylis Medical
Van Tilburg 2016	60	Sacroiliac joint pain for >3 months, failure of conservative management	Decrease of ≥2 on NRS following diagnostic block	RD 59.5 (27); Sham 62 (18)	NRS RD 7.2 (1.4); Sham 7.5 (1.2)	85°C each step for 90s, total of 5 steps	Same procedure as RD but no heat lesions made	Not reported
RD of the intervertebral discs								
Barendse 2001	28	Non-specific LBP for >1y, failure of conservative management	>50% pain relief 30 minutes after an analgesic discography at L4–L5 and L5–S1. Patients with multilevel pain excluded	RD 40.8 (7.5); Sham 45.2 (8.4)	VAS RD 6.5 (1.3); Sham 5.5 (1.1)	70°C for 90s without anaesthetic	Same procedure as RD but no current applied	Not reported
Desai 2016	63	Lumbar discogenic pain for ≥6 months, unresponsive to conservative management	Diagnosed via provocation discography - definite single-level concordant	Mean age 41 (11); Control 43 (11)	VAS RD 6.7 (NR); Sham 7 (NR)	RD at 50°C for 15 minutes and then 60°C for 2.5 min (bopolar cooled RD) with conventional	Conventional medical management	Halyard Health, Inc. (formerly Kimberly-Clark Health Care)

			pain on manometry			medical management		
Kapuraj 2013	55	CLBP unresponsive to conservative management for ≥6 months; no surgical interventions within previous 3 months	Single-level degenerative disc disease or two-level disease without evidence of additional degenerative changes in other disc spaces on MRI	RD 40.4 (10.3); Sham 38.4 (10.4)	VAS RD 7.13 (1.61); Sham 7.18 (1.98)	RD at 45°C bipolar for 15 minutes or 50°C bipolar for 15 minutes and monopolar at 60°C for 2.5 minutes	Mimicked active treatment, except that introducers and electrodes positioned just outside of the disc, and no RF energy delivered	Baylis Medical
Kvarstein 2009	20	Unremitting low back pain for more than 6 months; Pain intensity ≥5 /10 and low back pain greater than leg pain; Failure on conservative treatment	Positive one-level pain provocation discography	RD 44.7 (10.1); Sham 39.6 (8.9)	NRS RD 4.6 (1.8); Sham 5.5 (2.0)	RD increased by 5°C every second minute to 4-min interval at 65°C (from 50°C)	Exposed to a similar intervention, but the annulus was not exposed to RF heating	Radionics, TYCO Healthcare Group provided the discTRODE probes
Van Tilburg 2017	60	Low back pain >3 months and symptoms suggestive of lumbar disc problem	Reduction of ≥2 on a numerical rating scale (0–10) after a diagnostic ramus communicans test block	RD 50.5 (13.9); Sham 50.1 (12.3)	NRS 7.8 (1.05); Sham 7.8 (1.05)	RD treatment at 80 °C for 60s per level	Same procedure but without RF treatment	No support received that influenced submitted work
RD of the vertebrae body and endplate								

Fischgrund 2018	225	CLBP ≥6 months, not responded to conservative treatment, Type 1 or Type 2 Modic changes required at the proposed treatment levels	No diagnostic block for inclusion	RD 46.9 (range 26–69); Sham 47.1 (range 25–69)	VAS RD 6.73 (1.38); Sham 6.64 (1.34)	Thermal ablation at the terminus of the basivertebral nerve 85°C for 15 min	Same procedure as RD but only docking introducer cannula 1–2 mm into the pedicle and simulating RD	Not reported
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CLBP, chronic low back pain; N, number of trials; NRS, numeric rating scale; RD, radiofrequency denervation; SD, standard deviation; VAS, visual analogue scale.