**Table E14. Data abstraction of randomized controlled trials of exercise**

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Albaladejo, 2010 | Spain  8 centers  Primary care | Presenting for LBP with  no "red flags" for systemic disease or referral for surgery Excluded: bedridden, physiotherapy in previous 12 months, inflammatory rheumatologic disease, fibromyalgia | 69 randomized  69 completed  0% attrition  *Randomization of physicians who recruited subjects (i.e., cluster randomized)* | A. Education + 4 sessions of physiotherapy (n=100)  B. Education (n=139) C. Usual care (n=109) |
| Albert, 2012 | Denmark  Single center Secondary care facility (after unsuccessful treatment in primary care) | 18 to 65 years of age,  radicular pain of dermatomal distribution to the knee or below in 1 or both legs, leg pain > 3 on a 1- to 10-point scale at first visit to the clinic, and duration of  sciatica between 2 weeks and 1 year. EXCLUSION  cauda equina syndrome, pending worker’s litigation, previous back surgery, spinal tumors, pregnancy, a language other than Danish as  their first language, or an inability to follow the rehabilitation protocol  due to concomitant disease such as depression or heart failure. | Randomized, N=181  Analyzed, N=181  Attrition, 7.2% (13/181) | A: Symptom-guided exercises (n=95). Directional end-range exercises  and postural instructions guided by the individual patient’s directional preference (based on the McKenzie method); stabilizing exercises for the transverse abdominis and multifidus muscles and dynamic exercises for the outer layers of the abdominal wall and back extensors; all patients received home exercise programs  B: Sham exercises (n=96). Optional exercises that were not back related but were low-dose exercises to simulate an increase in systemic blood circulation.  Both groups received identical information and advice and optional paracetamol and/or NSAIDs. Treatment lasted for 8 weeks with a minimum of 4 and a maximum of 8 treatments. Patients were discouraged from receiving any additional treatment of their sciatica. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Albaladejo, 2010 | A vs. B vs. C  Median age: 51 vs. 51 vs. 53  Female sex: 68% vs. 63% vs. 72% Race: NR  Duration of pain >3 months: 72% vs. 78% vs. 89% Median pain intensity: 7.5 vs. 8 vs. 8  Median RDQ: 9.5 vs. 9.0 vs. 7.5  Median CSQ: 7.0 vs. 8.0 vs. 6.0  Median SF-12 PCS: 34.8 vs. 35.8 vs. 36.5  Median SF-12 MCS: 44.6 vs. 50.1 vs. 49.8 | Chronic (79.8% with pain >3 months, n=265) | 26 weeks |
| Albert, 2012 | A vs. B  Mean age (years): 46 vs. 44  Female: 43% vs. 53% Race NR  Pain etiology NR  Mean number of treatments: 5 vs. 5  Baseline  Current leg pain (LBPRS): 4.3 ± 2.3 vs. 4.5 ± 2.5  Total leg pain, median (IQR): 18 (15–21) vs. 18 (12–21);  p=NS  Disability (RDQ), median (IQR): 16 (11–18) vs. 15 (12–18)  Quality of Life: 0.62 ± 0.18 vs. 0.62 ± 0.62 | A vs. B  0–4 weeks: 25% vs. 18%  5–12 weeks: 59% vs. 63%  12–52 weeks: 16% vs. 19% | 12 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Albaladejo, 2010 | A vs. B vs. C  Change in median VAS, low back pain: -2.0 vs. -2.0 vs. 0  Change in median VAS, referred pain: -2.0 vs. -2.0 vs. -0.5  Improvement in RDQ: 2.0 vs. 1.6 vs. -0.3  Change in CSQ: -1.0 vs. -1.0 vs. 2.0  Change in SF-12 PCS: -3.2 vs. -2.4 vs. 0.6  Change in SF-12 MCS: -2.8 vs. -1.8 vs. 6.1 | NR | "Foundation  and other funds were received" | Fair | Also self-reported  satisfaction and interim time-point results;  Results reporting is poor; not describe between group comparisons' stat tests |
| Albert, 2012 | A vs. B  Current leg pain (LBPRS) (mean, SD)  8 weeks (end of treatment): 1.5 ± 2.1 vs. 2.3 ± 2.7;  p=0.06  EPC calc of test mean difference -0.8 (95% CI -0.09 to -1.15)  12 months: 1.5 ± 2.1 vs. 1.4 ± 2.4; p=NS Total leg pain (LBPRS) (median, IQR)  8 weeks: 4 (0–9) vs. 4 (0–12); p=NS  12 months: 3 (0–10) vs. 2 (0–8); p=NS Disability (RDQ) (median, IQR)  8 weeks: 6 (2–12) vs. 6 (2–12); p=NS  12 months: 3.5 (1–10) vs. 3.5 (1–10); p=NS  ≥30% improvement from baseline: 73% vs. 77.5%;  p=NS  Quality of Life (EQ-5D (mean, SD)  12 months: 0.82 ± 0.21 vs. 0.79 ± 0.24; p=NS Global improvement  8 weeks  Much better: 80% vs. 60% Some better: 14% vs. 26%  12 months:  Much better: 84% vs. 76% Some better: 16% vs.18%  Group A significantly (p<0.008) more improved (better or much better) compared with group B at both time points  Patient satisfaction: 93.5% vs. 90.5%; p=NS | NR | Federal,  institutional, and foundation funds | Fair | Global improvement  estimated from figure  3 of article  Do we care about nerve root compression signs and sick leave? They also report these outcomes |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Bronfort, 2011 | United States  Single center University research clinic | Age 18-65 years, primary  complaint of mechanical LBP ≥6 weeks w/w/o radiating pain to the lower extremity Excluded: previous  lumbar surgery, vascular disease, pain score <3 | 301 randomized  245 completed  19% attrition | A. Supervised exercise therapy for 12 weeks (n=100)  B. Chiropractic spinal manipulation for 12 weeks (n=100) C. Home exercise and advice for 12 weeks (n=101) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Bronfort, 2011 | A vs. B vs. C  Mean age: 44.5 vs. 45.2 vs. 45.6 years Female sex: 57% vs. 66% vs. 58% Race: NR  Duration of back pain: 4.8 vs. 5.0 vs. 5.0 years  Mean pain severity score (0-10): 5.1 vs. 5.4 vs. 5.2  Roland-Morris disability score (0-23): 8.4 vs. 8.7 vs. 8.7 | Chronic; median duration 4.8 to 5 (0-51) years | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Bronfort, 2011 | Only significant between-group differences in patient-  reported outcomes were for satisfaction (favoring A, p<0.01 at 12 weeks and p<0.001 at 52 weeks)  Overall treatment effect was significant for endurance (p<0.05) and strength (p<0.05) but not range of motion (also favoring A). | A vs. B vs. C  Nonserious adverse events: 1% (1/100) vs. 1% (1/100) vs. 4% (4/101)  All adverse events were transient, required little to no change in activity level, and were considered non-serious | NR | Good | Large tables of data  at each time point available |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Garcia, 2013 | Brazil  Single center  Outpatient clinics | Age 18-80 years,  nonspecific LBP ≥ 3 months’ duration. Excluded: any contraindication to physical exercise, serious spinal pathology (e.g., tumors, fractures, inflammatory disease), previous spinal surgery, nerve root compromise, cardiorespiratory illnesses, pregnancy | Randomized, N=148  Analyzed, N=148  Attrition, 1.4% (2/148) at 1 month; 0% at 3 months; 0.7% (1/148) at 6 months | A: McKenzie method (n=74). Exercises and progression tailored to the  individual. Included a basic educational component and guidance on completing the exercises at home. Patients with a direction preference for extension were instructed to use a back roll while sitting.  B: Back school (n=74). New exercises were prescribed and progressed following the sequence proposed by the program (i.e., not tailor to the individual). Educational component and theorectical and practical information given. All sessions except for the first were conducted in a group setting.  All patients received 4 one-hour sessions over 4 weeks. In all patients, directional preference was assessed at baseline and the treating therapist was informed before the randomization. All patients received  information in order to maintain lordosis while sitting without exacerbating their symptoms |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Garcia, 2013 | A vs. B  Mean age: 53.7 vs. 54.2 years Female: 78.4% vs. 68.9% Race: NR  Duration of LBP: 21 vs. 24 months  Recent episode of LBP: 62.2% vs. 63.5%  Pain intensity (NRS, 0-10): 6.77 ± 2.12 vs. 6.41 ± 2.54  Disability (RDQ, 0-24): 11.32 ± 4.95 vs. 11.08 ± 5.84  Quality of life (WHOQOL-BREF, 0-100)  Physical domain: 51.64 ± 14.49 vs. 51.49 ± 17.05  Psychological domain: 62.88 ± 15.86 vs. 60.11 ± 15.86  Social domain: 63.62 ± 18.27 vs. 63.15 ± 18.96  Environmental domain: 55.40 ± 13.66 vs. 54.74 ± 16.09 | Chronic (≥ 3 months)  A vs. B  duration of symptoms: 21 ± 28 vs. 24 ± 83 months | 1, 3, 6 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Garcia, 2013 | Unadjusted mean difference ± SD for A vs. B;  adjusted mean difference (95% CI) for B – A  **Pain intensity (NRS, 0–10)**  1 month: 4.14 ± 2.87 vs. 4.39 ± 2.73; 0.66 (–0.29 to  1.62), p=0.17  3 months: 5.18 ± 2.61 vs. 5.53 ± 2.78; 0.71 (–0.23 to  1.67), p=0.14  6 months: 5.09 ± 2.89 vs. 5.19 ± 3.08; 0.48 (–0.47 to  1.43), p=0.32  **Disability (RDQ, 0–24)**  1 month: 6.20 ± 5.06 vs. 8.15 ± 5.79; 2.37 (0.76 to  3.99), p=0.004  3 months: 7.12 ± 5.67 vs. 8.39 ± 6.30; 1.51 (–0.09 to  3.11), p=0.06  6 months: 6.77 ± 6.02 vs. 8.12 ± 6.45; 1.55 (–0.05 to  3.16), p=0.06  Achievement of MCID (5-point improvement): 53% (39/74) vs. 30% (22/73), p=0.01; RR 1.8, 95% CI 1.2 to 2.7\*  **Quality of Life (WHOQOL-BREF, 0-100) Physical domain**  1 month: 62.45 ± 16.94 vs. 59.27 ± 16.88; –3.65  (–8.26 to 0.96), p=0.12  3 months: 62.25 ± 15.37 vs. 57.43 ± 17.76; –4.67 (–9.26 to –0.07), p=0.04  6 months: 61.48 ± 16.12 vs. 60.76 ± 18.87; –0.44 (–5.04 to 4.16), p=0.85  **Psychological domain**  1 month: 67.68 ± 15.15 vs. 65.12 ± 13.98; –0.18 (–4.17 to 3.80), p=0.92  3 months: 67.62 ± 16.07 vs. 65.14 ± 14.14; 0.14 (–3.82 to 4.11), p=0.94  6 months: 68.00 ± 14.18 vs. 66.72 ± 14.15; 1.50 (–2.48 to 5.47), p=0.46 | A vs. B  0% (0/74) vs. 1.4% (1/74) (temporary exacerbation of pain during the third session which has ceases by the 4th week) | the Fundacao  de Amparo a Pesquisa do Estado  de Sao Paulo (FAPESP), Brazil. | Good |  |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Garcia, 2013  (Cont.) | Social domain  1 month: 67.45 ± 18.00 vs. 67.24 ± 15.96; –0.47 (–5.50 to 4.56), p=0.85  3 months: 69.03 ± 16.11 vs. 65.76 ± 16.00; –3.15 (–8.16 to 1.85), p=0.21  6 months: 66.00 ± 18.74 vs. 66.09 ± 15.00; 0.26 (–4.75 to 5.28), p=0.91  Environmental domain  1 month: 58.57 ± 14.82 vs. 57.62 ± 16.48; –0.51 (–4.06 to 3.03), p=0.77  3 months: 58.23 ± 14.65 vs. 56.16 ± 14.75; –1.41 (–4.94 to 2.12), p=0.43  6 months: 57.84 ± 14.61 vs. 57.44 ± 15.00; 0.29 (–3.24 to 3.83), p=0.87  \*RR (95% CI) calculated by EPC |  |  |  |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| George, 2008 | United States  Multicenter (3) Outpatient clinics | Age 15 to 60 years,  ability to read and speak English, QTFSD classification 1a or 1b (acute or sub acute LBP without radiation below the gluteal fold) or 2a or  2b (acute or sub-acute LBP with proximal radiation to the knee) or  3a or 3b (acute or sub- acute LBP with distal radiation below the knee). EXCLUSION  any other QTFSD classification; pregnancy; osteoporosis | N=108  Analyzed, N=102  Attrition, 29.4% (30/102) | A: Treatment based classification + Graded Exposure (GX) (n=33). Fearful activities assessed;  top 2 most feared activities implemented under this protocol using progression based on NRS fear rating and performed under supervision of PT and clinical staff. Also received patient education materials focused on biopsychosocial model.  B: Treatment based classification + Graded Activity (GA) (n=35). Parameters (duration, intensity, and frequency) used to reach pain tolerance were then established as the activity quota; graded activity principles were used to progress exercise during subsequent treatment sessions. Also received patient education materials focused on biopsychosocial model  C: Physical therapy based on the treatment-based classification system (Delitto et al.) (n=34). Also received educational materials that were anatomically focused. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| George, 2008 | A vs. B vs. C  Mean age (years): 40.1 vs. 37.6 vs. 34.9  Female: 64% vs. 69% vs. 68% Race NR  Pain etiology NR  Prior history of LBP: 67% vs. 69% vs. 50% Referred leg pain: 42% vs. 49% vs. 38% Baseline  Pain (NRS): 4.7 ± 2.1 vs. 5.2 ± 1.8 vs. 4.3 ± 2.0  Function (PIS): 3.1 ± 1.6 vs. 3.6 ± 2.1 vs. 2.9 ± 1.7  Disability (ODI): 30.7 ± 15.6 vs. 31.1 ± 15.8 vs. 29.2 ± 15.7 | Acute and sub-acute; operationally defined as  reporting current symptoms for 1–24 weeks  A vs. B vs. C  duration of current LBP episode (weeks): 9.8 vs. 5.8 vs. 6.7; p=0.015 | 6 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| George, 2008 | A vs. B vs. C  Pain intensity (NRS, 0–10)  **High fear**  Baseline: 5.1 ± 2.1 vs. 5.1 ± 1.9 vs. 5.1 ± 1.8  4 weeks: 2.1 ± 2.0 vs. 2.3 ± 2.1 vs. 2.0 ± 1.6  6 months: 2.1 ± 2.3 vs. 1.5 ± 2.1 vs.1.6 ± 1.3  **Low fear**  Baseline: 3.9 ± 1.5 vs. 4.9 ± 2.1 vs. 3.1 ± 2.1  4 weeks: 1.7 ± 0.9 vs. 2.1 ± 2.1 vs. 1.8 ± 1.9  6 months: 1.0 ± 1.0 vs. 2.3 ± 1.7 vs. 1.0 ± 1.2  Disability (ODI, 0–100)  **High fear**  Baseline: 32.3 ± 16.3 vs. 29.9 ± 18.4 vs. 32.9 ± 16.1  4 weeks: 16.5 ± 12.1 vs. 11.5 ± 11.8 vs.16.4 ± 14.9  6 months: 16.7 ± 17.6 vs. 11.3 ± 14.2 vs.11.4 ± 11.5  **Low fear**  Baseline: 20.4 ± 13.1 vs. 30.4 ± 13.3 vs. 23.0 ± 15.5  4 weeks: 11.4 ± 11.6 vs. 16.7 ± 11.9 vs. 12.0 ± 11.5  6 months: 9.7 ± 8.2 vs. 15.8 ± 11.1 vs. 5.8 ± 7.1 p=NS for all comparisons | No adverse events reported during  followup | NIH-NIAMS  Grant  AR051128 | Poor |  |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| George, 2008 (cont.) | Effect sizes  Pain intensity (NRS, 0-10)  4 weeks  A vs. B: 0.11  A vs. C: –0.05  B vs. C: –0.16  6 months  A vs. B: –0.32  A vs. C: –0.26  B vs. C: 0.01  Disability (ODI, 0-100)  4 weeks  A vs. B: –0.40  A vs. C: –0.02  B vs. C: 0.39  6 months  A vs. B: –0.38  A vs. C: –0.37  B vs. C: 0.01  p=NS for all comparisons. These post hoc effect sizes suggest that for the primary comparisons of interest (GX vs. GA and GX vs. treatment based classification) total sample sizes needed to detect these magnitudes of differences would range from 114 to over 700. Proportion of Success vs. Failure (ODI >10 point change, NRS >2 point change) at 6 months  NRS 46% vs. 43% vs. 41% ODI 43%41%, 56% p=0.70 |  |  |  |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Hagen, 2010 | Norway  Single center  Outpatient spine clinic | Age 18–60 years; sick  listed (i.e., sick leave from work) for 8–12 weeks for LBP w/w/o sciatica  EXCLUSION  on sick leave >12 weeks, not sick listed,  pregnancy, recent low back trauma, cauda equina symptoms, cancer, osteoporosis, rheumatic low back disease, ongoing treatment for LBP by another specialist, and information from the general practitioner on the sickness certificates indicating forthcoming return to work. | Randomized, N=246  Analyzed, N=246  Attrition, 3.3% (8/246) | A: Standardized physical exercise program (n=124). Aim was to re-  educate the trunk muscle to its normal stabilizing role and to improve balance, muscle coordination, and proprioception; program included warm-up (8 minutes), circuit training (34 minutes), stretching (13 minutes), and relaxation (5 minutes); duration 1 hour, 3x/week for 8 weeks.  B: No treatment (n=122). Received a brief intervention program before randomization. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Hagen, 2010 | A vs. B  Mean age (years): 40.7 vs. 41.6  Female: 52% vs. 50% Race NR  Pain etiology NR  Previous sick leave for LBP: 72% vs. 75% | Unclear | 24 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Hagen, 2010 | Only statistically significant difference found was for  the sock test (physical function), which was more improved in Group A vs. B: mean difference –0.34;  95% CI, –0.66 to –0.01; p=0.041 (time point NR).  No statistically significant difference between groups at any followup time point - 6, 12, 18 or 24 months - for the following (no data provided):  Pain intensity  Functional tests (pick-up test, loaded reach test, 15 meter walk, fingertip-to-floor test, static balance test) Physical activity  Walking distance  Disability (RDQ)  Subjective health complaints Psychological distress (HSCL-25) Return to work | NR | EXTRA funds  from the Norwegian Foundation for Health and Rehabilitation, Grant No. Nkr  840 000 (Euro  105 000) | Fair | Percentage of  patients that returned to work and self- reported physical activity are presented in Figures 2 and 3. Is it worth estimating from the graphs?  Both groups increased return to work, reported less pain and better function, and reduced fear-avoidance  beliefs for physical activity during the followup period; authors provide change score for all patients which I did not extract assuming it is not relevant/helpful |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Hartvigsen, 2010 | Denmark  Single center Outpatient back pain clinic | LBP with or without leg  pain >8 weeks, average pain score >3 (on 11- point NRS) during previous 2 weeks, and had completed 4 weeks of previous treatment Excluded: unable to sit  on a stationary bike for at least 30 minutes, other comorbidities preventing full participation | 136 randomized  126 completed  7% attrition | A. Supervised Nordic walking in groups twice/week for 8 weeks (n=45)  B. Nordic walking instruction for 1 hour, with instruction to continue independently (n=46)  C. Active living and exercise information (n=45) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Hartvigsen, 2010 | A vs. B vs. C  Mean age: 49.2 vs. 45.4 vs. 45.5 years Female sex: 76% vs. 69% vs. 68% Race: NR  LBP rating scale (0-100), pain: 46.1 vs. 50.7 vs. 47.3  LBP rating scale (0-100), function: 44.4 vs. 47.3 vs. 48.9  Patient-specific function scale (0-100): 18.4 vs. 20.1 vs.  17.3  EQ-5D (0-100): 67.5 vs. 62.7 vs. 63.9 | Subacute/chronic: >8 weeks (mean duration NR) | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Hartvigsen, 2010 | A vs. B vs. C  Mean improvement at 8 weeks in LBP rating scale, pain: 8.8 vs. 3.4 vs. 4.8; significant at all time points for group A, significant only at 8 and 26 weeks for group B, significant only at 8 weeks for group C; no significant between-group differences at any point Mean improvement at 8 weeks in LBP rating scale, function: 7.4 vs. 3.2 vs. 3.8; significant at all time points for group A, never significant for group B, and significant only at 8 and 26 weeks in group C; no significant between-group differences at any point Patient-specific function scale: all groups improved significantly from baseline, but there were no between-group differences  EQ-5D: very small and similar changes in all groups | NR | NR | Fair | Most data reported in  figures |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Helmhout, 2008 | Netherlands  Muticenter (6)  PT department in military primary care clinics | military employees of the  Dutch army, age 18-54 years, ≥4 weeks of continuous or recurrent (at least 3 times a week) episodes of LBP, pain localized between posterior iliac crests and angulus inferior scapulae, with or without radiation in the legs,  availability in duty time to visit the local military health center 2 times a week during 10 consecutive weeks, with no more than 2 sessions of absence because of job-related activities (e.g., military exercise, course, leave), and willingness to abandon other treatment interventions for the  lower back during the intervention period. | Randomized, N=127  Analyzed, N=127  Attrition, 15.7% (20/127) | A: Lumbar extensor strength training program (n=71). Standardized,  progressive resistance training of the isolated lumbar extensor muscle groups aimed at both strength and endurance gain; duration 10 weeks,  14 sessions 2x/w and 3 isometric back strength tests (in weeks 1, 5, and 10). Training sessions were carried out on a Total Trunk Rehab machine. Patients were not allowed to undergo cotreatments during the treatment period.  B: Regular PT program (n=56). Regular PT for 10 weeks, or less when the patient was free of complaints; could include hands-on treatment (e.g., passive mobilizing and pain cushioning  techniques, manual therapy) and/or hands-off treatment (e.g., exercise therapy, individual education, instruction on the back function) (in the Dutch army, active therapy forms are favored); no cotreatments allowed, nor exercise on equipment that mimicked the specific components of the lower back machine . |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Helmhout, 2008 | A vs. B  Mean age (years): 37 vs. 35  Female: 3% vs. 4% Race NR  Pain etiology NR  Prior LBP complaints: 76% vs. 74% Pain radiating to legs: 10% vs. 10%  Work absenteeism in last year due to LBP: 10% vs. 8% Baseline  Function (PSFS): 178 ± 65 vs. 178 ± 52  Disability (RDQ): 8.3 ± 4.8 vs. 7.9 ± 4.4  Back extension strength (NMT): 214 ± 64 vs. 212 ± 65 | A vs. B  <4 weeks: 0% vs. 2%  4–6 weeks: 8% vs. 16%  6–12 weeks: 20% vs. 27%  3–6 months: 20% vs. 9%  6–12 months: 15% vs. 7%  ≥12 months: 36% vs. 39% | 62 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Helmhout, 2008 | A vs. B (mean ± SD; between group difference, 95%  CI)  Function (PSFS, score 0–300)  5 weeks: 119 ± 70 (n=64) vs. 116 ± 67 (n=46)  10 weeks: 85 ± 72 (n=59) vs. 97 ± 74 (n=47);  –0.608 (–2.693 to 1.477), p=0.57  36 weeks: 74 ± 72 (n=57) vs. 64 ± 59 (n=37)  62 weeks: 69 ± 71 (n=61) vs. 65 ± 69 (n=45);  –0.136 (–0.344 to 0.616), p=0.58  Disability (RDQ, score 0–24)  5 weeks: 5.8 ± 4.8 (n=64) vs. 4.2 ± 4.2 (n=46)  10 weeks: 3.4 ± 4.6 (n=59) vs. 3.5 ± 4.2 (n=47);  –0.025 (–0.134 to 0.085), p=0.66  36 weeks: 3.2 ± 4.3 (n=57) vs. 2.7 ± 3.8 (n=37)  62 weeks: 2.6 ± 4.4 (n=61) vs. 2.5 ± 3.9 (n=45);  0.000 (– 0.025 to 0.026), p=0.99  Global perceived effect (GPE)  5 weeks: no data  10 weeks: 2.4 ± 0.8 (n=59) vs. 2.4 ± 0.7 (n=47)  36 weeks: 2.5 ± 1.0 (n=57) vs. 2.3 ± 0.9 (n=37)  62 weeks: 2.2 ± 1.0 (n=61) vs. 2.3 ± 1.0 (n=45);  –0.002 (–0.010 to 0.006), p=0.66  LBP episodes  6 months (back pain in 1st half of year after the end of the treatment period?) (A, n=56; B, n=40):  No, not at all: 9% vs. 18%  Yes, incidentally: 57% vs. 63% Yes, monthly: 11% vs. 3%  Yes, weekly: 23% vs. 18%  12 months (back pain in 2nd half of year after the end of the treatment period?) (A, n=61; B, n=46):  No, not at all: 25% vs. 22% Yes, incidentally: 55% vs. 50% Yes, monthly: 2% vs. 11%  Yes, weekly: 18% vs. 17% | A vs. B  1.4% (1/71; acute lumbago) vs. 0% (0/56) | NR | Poor |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Helmhout, 2008  (cont.) |  | EXCLUSION  spinal surgery in the last  2 years;  specific treatment for LBP in the last 4 weeks (e.g., PT, manual therapy); severe LBP  that hindered performing maximal isometric strength efforts; and specific LBP, defined as herniated disk, ankylosing spondylitis, spondylolisthesis, or other relevant neurologic diseases |  |  |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Helmhout, 2008  (cont.) | Patient satisfaction (very satisfied; final degree of  satisfaction at end of treatment program): 89% (n =  56) vs. 89% (n=46)  Back extension strength (NMT)  5 weeks: 23 ± 62 (n=64) vs. 246 ± 74 (n=46)  10 weeks: 244 ± 66 (n=59) vs. 247 ± 73 (n=47)  36 weeks: 264 ± 64 (n=57) vs. 254± 73 (n=37)  62 weeks: 267 ± 62 (n=61) vs. 249 ± 74 (n=45)  p=NS for all timepoints |  |  |  |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Henchoz, 2010 | Switzerland  Single center  Spine unit | Age 18-60 years,  subacute or chronic LBP, phases 2-6 of Krause classification, without neurologic deficit Excluded: phases 7-8 of Krause classification,  total disability pension, sciatica, pregnancy,  acute rheumatic disease, spinal fracture in  previous 3 months, osteoporosis, tumor, heart or respiratory failure, drug addiction, psychiatric pathology | 105 randomized  91 completed  13% attrition | A. Functional multidisciplinary rehabilitation, followed by a 12-week  exercise program (n=56)  B. Functional multidisciplinary rehabilitation, followed by usual care  (n=49) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Henchoz, 2010 | A vs. B  Mean age: 41 vs. 39 years Female sex: 34% vs. 45% Race: NR  Mean VAS: 5.3 vs. 5.1 | Subacute/chronic (mean duration NR) | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Henchoz, 2010 | A vs. B, end of functional multidisciplinary rehabilitation-  1 year  ODI: 30.2-25.3 (p<0.001) vs. 30.5-27.2 (p=0.059) VAS: 3.8-3.8 (p=0.521) vs. 3.6-3.8 (p=0.995) PSFS: 66.1-89.8 (p<0.05) vs. 65.5-78.8 (p=0.653)  Sorensen test (s): 64.8-81.6 (p<0.05) vs. 67.1-63.9 (p=0.249)  MMS test, flexion (cm): 5.65-5.15 (p=0.368) vs. 5.27-  5.19 (p=0.561)  MMS test, extension (cm): -1.63 to -1.61 (p=0.138)  vs. -1.46 to -1.64 (p=0.353)  Fingertip-floor distance (cm): 126.5-135.7 (p=0.076)  vs. 129.1-136.0 (p=0.470)  Shirado test (s): 11.3-8.0 (p=0.063) vs. 17.3-10.0 (p<0.001)  Modified Bruce test (min): 11.2-8.4 (p<0.001) vs. 11.2-  8.7 (p<0.001) | NR | None | Poor |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Hofstee, 2002 | Netherlands  Single center  Outpatient clinic | Age < 60 years, radicular  pain <1 month’s duration, available for 6 months of followup, and able to provide informed consent EXCLUSION  cauda equina syndrome or severe  weakness (Medical  Research Council grade  <3), previous bed rest or physiotherapy, or unwilling to comply with one of the three treatment strategies | Randomized, N=250  Analyzed, N=250  Attrition, 10% (25/250) | A: Physiotherapy (n=83). The protocol consisted of instructions and  advice, segmental mobilization, disc unloading and loading exercises, depending on patients’ conditions, and hydrotherapy; 2x/week for at least  4 to, at most, 8 weeks; asked to perform daily exercises at home.  B: Bed rest (at home or in-hospital) (n=84). Instructed to stay in bed for  7 days; only allowed out of bed to use the bathroom and shower. After this period, patients supposed to rest as much as possible when in pain. C: Continuation of ADLs (control group) (n=83). Continue jobs, household activities, studies, or hobbies to the best of the patients' abilities; advised to adjust the intensity, duration, and frequency of their activities according to the pain they experienced.  All patients received a brochure with instructions and advice regarding their respective treatment; were allowed to use analgesic medication and to call the investigator for help if they had problems or questions. When patients called, they were reassured and urged to comply with their assigned treatment; if necessary, they were seen at the outpatient clinic. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Hofstee, 2002 | A vs. B vs. C  Mean age (years): 38 vs. 38 vs. 41.9; p=0.02  Female: 37% vs. 32% vs. 31% Race NR  Pain etiology NR  Previous LBP: 70% vs. 70% vs. 65% Previous sciatica: 32% vs. 34% vs. 25% Past lumbar surgery: 5% vs. 3% vs. 2%  Root compression on CT: 60% vs. 63% vs. 58% Baseline  Pain (VAS, 0-100): 60.9 ± 20.1 vs. 65.5 ± 18.5 vs. 60.7 ±  21.4  Disability (QDS): 56.0 ± 17.6 vs. 58.6 ± 14.6 vs. 57.4 ± 16.3 | Mixed acute/subacute (radicular pain < 1 month) | 6 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Hofstee, 2002 | Mean improvement in scores from baseline, A vs. B,  vs. C  Pain (VAS, 0–100)  1 month (mean): 24.2 (n=80) vs. 25.9 (n=84) vs.  23.4 (n=83)  1 month differences (95% CI) A vs. B: –1.7 (NR)  A vs. C: 0.8 (–8.2 to 9.8)  2 months (mean): 37.0 (n=77) vs. 38.1 (n=82) vs.  37.3 (n=79)  2 months difference (95% CI) A vs. B: –1.1 (NR)  A vs. C: –0.3 (–9.4 to 10.0)  6 months (mean): 46.8 (n=72) vs. 48.2 (n=78) vs.  47.8 (n=75)  6 months difference (95% CI) A vs. B: –1.4 (NR)  A vs. C: –1.0 (–10.0 to 8.0) Disability (QDS, 0–100)  1 month (mean): 15.7 (n=80) vs. 11.4 (n=84) vs.  16.2 (n=83)  1 month differences (95% CI) A vs. B: 4.3 (NR)  A vs. C: –0.5 (–6.3 to 5.3)  2 months (mean): 26.3 (n=77) vs. 23.5 (n=82) vs.  26.3 (n=79)  2 months difference (95% CI) A vs. B: 2.8 (NR)  A vs. C: 0.0 ( –7.2 to 7.3)  6 months (mean): 34.6 (n=72) vs. 32.7 (n=78) vs.  35.4 (n=75)  6 months difference (95% CI) A vs. B: 1.9 (NR)  A vs. C: –0.7 (–8.4 to 6.9) | New sciatica, 4% (10/250)  Cauda equina syndrome, 0.4% (1/250)  Pulmonary embolism, 0.4% (1/250) (this patient was in group B; 1.2% (1/84)) | Hoelen  Foundation | Poor | Confidence intervals  could not be calculated for the difference between A vs. B at any timepoint because no SDs were provided.  Unclear if the cauda equina syndrome was also in a patient from group B (bed rest) |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Hofstee, 2002  (cont.) | Cumulative No. of patients, A vs. B vs. C; OR (95%  CI)  Treatment failure  1 month: 2% (n=2) vs. 6% (n=5) vs. 7% (n=6); A  vs. C: 0.3 (0.1–1.6); A vs. B: NR  2 months: 13% (n=11) vs. 19% (n=16) vs. 12% (n  = 10); A vs. C: 1.1 (0.7–2.8); A vs. B: NR  6 months: 23% (n=19) vs. 25% (n=21) vs. 17% (n  = 14); A vs. C: 1.5 (0.7–3.2); A vs. B: NR Surgery  1 month: 2% (n=2) vs. 5% (n=4) vs. 6% (n=5); A  vs. C: 0.4 (0.1–2.0); A vs. B: NR  2 months: 12% (n=10) vs. 13% (n=11) vs. 11% (n  = 9); A vs. C: 1.1 (0.4–2.9); A vs. B: NR  6 months: 16% (n=13) vs. 19% (n=16) vs. 13% (n  = 11); A vs. C: 1.2 (0.5–2.9); A vs. B: NR |  |  |  |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Hurley, 2015 | Ireland  5 centers  Acute public teaching hospital | Age 18-65 years,  nonspecific LBP ≥3 months or ≥3 episodes in previous 12 months, no recent spinal injury, and low to moderate levels of physical activity  Excluded: received treatment for LBP in previous 3 months, radicular pain indicative of nerve root compression, systemic inflammatory disease, severe spinal stenosis, fibromyalgia, neurological disorders, cancer, or acute or subacute LBP with <3 episodes in previous 12 months | 246 randomized  110 completed  28% attrition | A. Exercise class for 8 weeks (n=83)  B. Walking program for 8 weeks (n=82)  C. Usual physiotherapy for 8 weeks (n=81) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Hurley, 2015 | A vs. B vs. C  Mean age: 45.8 vs. 46.2 vs. 44.2 years Female sex: 71% vs. 71% vs. 62% Race: NR  Duration of LBP: 7.0 vs. 8.7 vs. 7.5 years  Mean pain over past week, NRS: 5.6 vs. 5.5 vs. 6.0  ODI: 38 vs. 35 vs. 33  EQ-5D: 0.52 vs. 0.57 vs. 0.51  Low physical activity: 44% vs. 62% vs. 58% Moderate physical activity: 39% vs. 33% vs. 30% | Chronic: mean duration 7.0-8.7 years | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Hurley, 2015 | A vs. B vs. C  ODI: 27 vs. 27 vs. 27; p=0.37  Average pain, NRS: 5.1 vs. 4.2 vs. 4.1; p=0.15  EQ-5D: 0.62 vs. 0.63 vs. 0.62; p=0.72 | A vs. B vs. C  Withdrawal due to adverse events:  0% vs. 8.5% (7/82) vs. 0% | Health  Research Board Project Grant | Fair | Other belief scales  available (all nonsignificant), as well as other time points |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Jensen, 2012 | Denmark  Single center Outpatient back pain clinic | Age 18-60 years,  persistent LBP with or without radiculopathy, pain ≥3 on 11-point NRS, duration of current symptoms 2-12 months, at least one modic change extending into  the vertebral body, and previous unsuccessful primary care treatment | 100 randomized  96 completed  4% attrition | A. Rest, avoiding hard physical activity and rest twice daily for one hour  over 10 weeks (n=50)  B. Exercise for 10 weeks (n=50) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Jensen, 2012 | A vs. B  Mean age: 47 vs. 45 years Female sex: 67% vs. 69% Race: NR  Mean pain, NRS: 5.6 vs. 5.1  Mean RDQ: 12.0 vs. 13.3  Mean EQ-5D: 0.68 vs. 0.62  Mean BDI: 10.7 vs. 9.6 | Subacute/chronic ("persistent", duration of current  symptoms 2-12 months, mean duration NR) | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Jensen, 2012 | A vs. B (adjusted differences for intervention group)  Posttreatment  Pain: 5.0 vs. 4.5; adjusted difference -0.07 (95% CI -  0.9 to 0.7)  RDQ: 11.0 vs. 11.1; adjusted difference -0.6 (95% CI -  2.2 to 1.0)  EQ-5D: 0.7 vs. 0.7; adjusted difference 0.04 (95% CI -  0.007 to 0.09)  BDI: 8.6 vs. 7.9; adjusted difference 0.67 (95% CI -  0.99 to 2.3) vs. 0.08 (95% CI -0.3 to 0.4)  One-year followup  Pain: 4.8 vs. 4.3; adjusted difference -0.3 (95% CI -  1.3 to 0.6)  RDQ: 10.7 vs. 10.7; adjusted difference -1.2 (95% CI -  3.3 to 1.0)  EQ-5D: 0.7 vs. 0.7; adjusted difference 0.06 (95% CI -  0.008 to 0.14)  BDI: 9.5 vs. 8.0; adjusted difference -0.92 (95% CI -  2.8 to 0.97) vs. -0.17 (95% CI -0.6 to 0.22) | No adverse events reported in any  group | VELUX  Foundation | Good | No differences in any  outcome between groups |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Kell, 2011 | Alberta  Community setting | Men and women aged  18 - 50 years old with chronic (≥3 months, ≥3 days per week) nonspecific (soft tissue in origin) low back (lumbar  1–5) pain (visual  analogue scale [VAS] ≥3). Excluded: pain below the knee,  spinal stenosis, herniated or ruptured disc(s), spondylolisthesis, infection in the lumbosacral area, tumor(s), scoliosis, rheumatologic disorder, osteoporosis, previous back  surgery, usage of any prescriptive or nonprescriptive pain medication, history of metabolic, endocrine, cardiovascular, or neurological disease. | 240 randomized  207 completed  13.75% attrition | A. Periodized musculoskeletal rehabilitation (PMR) training four days per  week with 1,563 repetitions each week (n=60)  B. PMR training three days per week with 1,344 repetitions each week (n  = 60)  C. PMR training twice per week with 564 repetitions per week (n=60) D. No training (n=60) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Kell, 2011 | A vs. B vs. C vs. D  Mean age: 42.4 ± 5.6 vs. 41.7 ± 6.1 vs. 42.8 ± 6.3 vs. 43.2 ±  5.9  Female sex: 30% vs. 37% vs. 33% vs. 38.3% Race: NR  Pain duration >3 months: 100% vs. 100% vs. 100% vs. 100% | Chronic (100% with pain > 3 months) | 13 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Kell, 2011 | A vs. B vs. C vs. D  VAS pain: 4.35 ± 0.95 vs. 4.77 ± 1.00 vs. 4.96 ± 1.03 vs. 5.70 ± 0.86  p≤0.05 difference A vs. B, C, and D  p≤0.05 difference B and C vs. D  Bench press (function): 79.3 ± 9.7 vs. 70.4 ± 9.1 vs  68.2 ± 9.7 vs. 53.3 ± 9.3  p≤0.05 difference A vs. B, C, and D  Lat pull down (function): 75.3 ± 7.1 vs. 70.1 ± 7.7 vs  67.2 ± 7.4 vs. 56.0 ± 6.1  p≤0.05 difference A vs. B, C, and D  p≤0.05 difference B and C  Leg press (function): 237.2 ± 29.0 vs. 201.7 ± 30.8 vs  184.2 ± 29.5 vs. 139.9 ± 28.9 p≤0.05 difference A vs. B, C, and D p≤0.05 difference B and C  ODI: 27.1 ± 10.7 vs. 31.6 ± 11.1 vs. 31.8 ± 10.9 vs  39.1 ± 10.1  p≤0.05 difference A vs. B, C, and D  p≤0.05 difference B and C vs. D  PCS: 55.7 ± 7.8 vs. 50.4 ± 8.0 vs. 50.2 ± 8.7 vs. 45.0 ±  8.0  p≤0.05 difference A vs. B, C, and D  p≤0.05 difference B and C vs. D  MCS: 57.7 ± 8.2 vs. 52.6 ± 7.8 vs. 53.1 ± 8.3 vs. 46.0 ±  8.2  p≤0.05 difference A vs. B, C, and D  p≤0.05 difference B and C vs. D | The authors report no occurrence of  adverse events in treatment groups  A and B.  NR for treatment groups C and D. | The University  of Alberta, Augustana Campus Research and Travel Grant. | Poor |  |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Little, 2008 | England  64 centers  General practice | Age 18-65 years, with  LBP ≥3 months, score ≥4 on Roland disability  scale, and current pain for ≥3 weeks  Excluded: serious spinal disease, current nerve root pain, previous spinal surgery, inability to walk  100 m | 579 randomized  463 completed  20% attrition | A. Exercise + 24 lessons in Alexander technique (n=71)  B. Exercise + 6 lessons in Alexander technique (n=71) C. Exercise + massage (n=72)  D. Exercise (n=72)  E. 24 lessons in Alexander technique (n=73) F. 6 lessons in Alexander technique (n=73) G. Massage (n=75)  H. Usual care (n=72) |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Little, 2008 | Alexander technique control vs. massage vs. 6 lessons vs.  24 lessons vs. exercise control vs. exercise  Mean age: 46 vs. 46 vs. 45 vs. 45 vs. 45 vs. 46 years  Female sex: 73% vs. 78% vs. 63% vs. 64% vs. 68% vs.  71% Race: NR  Median number of days in pain in previous 4 weeks: 24.5 vs. 28 vs. 28 vs. 28 vs. 28 vs. 28 | Chronic; >3 months, average 243 ± 131 days of pain  in past 12 months | 52 weeks |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Little, 2008 | A vs. B vs. C vs. D vs. E vs. F vs. G vs. H  Roland disability score vs. usual care: -4.22  (p=0.002) vs. -2.98 (p=0.002) vs. -2.37 (p=0.015) vs. -  1.65 vs. -4.14 (p<0.001) vs. -1.44 vs. -0.45 vs. 0 (ref) Number of days of pain in previous 4 months vs. usual care: -20 (p=0.001) vs. -13 (p=0.031) vs. -11  vs. -11 vs. -20 (p=0.001) vs. -13 (p=0.034) vs. -8 vs. 0 (ref)  SF-36 PCS vs. usual care: 9.43 (p=0.015) vs. 8.53 (p=0.029) vs. 3.63 vs. -2.08 vs. 11.83 (p=0.002) vs.  2.04 vs. -1.45 vs. 0 (ref)  SF-36 MCS vs. usual care: 4.99 vs. 0.64 vs. 2.73 vs.  0.72 vs. 3.74 vs. 4.10 vs. -2.11 vs. 0 (ref) | One patient reported that massage  made their back pain worse | Medical  Research  Council | Good | Deyo  troublesomeness score, Von Korff score, back health transition, fear avoidance, and back health measures also reported, at one year and interim time points; although good quality, results are reported in a very confusing way;  difficult to separate out exercise component |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Macedo, 2012 | Australia,  multicenter,  primary care settings | chronic nonspecific LBP  (3 months’ duration) w/w/o leg pain; currently seeking care for LBP; 18-  80 years of age; English speaker; patient suitable for active exercises; expected to continue residing in the Sydney or Brisbane region for the study duration; score of moderate or greater on question 7 or 8 of the SF-  36.  EXCLUDE: known or suspected serious pathology such as nerve root compromise (at least 2 of the following signs: weakness, reflex changes, or sensation  loss, associated with the same spinal nerve); previous spinal surgery or scheduled for surgery during trial period; comorbid health conditions that would prevent active participation in exercise programs. | Randomized: N=172  Analyzed: 2 months, n=158; 6 and 12 months, n=155  Attrition: 9.9% (17/172) | A: MCE; stage 1=retraining program to improve activity of muscles  assessed to have poor control and reduce activity of any muscle identified to be overactive; taught how to contract trunk muscles in a specific manner and progress until able to maintain isolated contractions of the target muscles for 10 reps of 10 seconds each while maintaining normal respiration (feedback available to enhance learning); additional exercises for breathing control, spinal posture, and lower limb and trunk movement were performed; stage 2 = progression toward more functional activities, first using static and then dynamic tasks; motor control exercise guided by pain, and exercises were mostly pain-free. (n  = 86)  B: Graded activity; increase activity tolerance  by performing individualized and submaximal exercises (based on activities that each participant identified as problematic/could not perform due to pain), in addition to ignoring illness behaviors and reinforcing wellness behaviors; activities progressed in a time-contingent manner; patients received daily quotas and instructed to only perform the agreed amount. (n=86)  Both groups to receive 14 individually supervised sessions of approximately 1 hour (12 initial treatment sessions over an 8-week period [2x week for first 4 weeks then 1x/week for next 4 weeks] and 2 booster sessions at  4 and 10 months following randomization; advised to do home exercises (type, intensity, number at discretion of PT) for 30 mins/week in first month and 1 hr/week in second month. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Macedo, 2012 | A vs. B  Mean age (years): 48.7 vs. 49.6  Female: 66.3% vs. 52.3% Race: NR  Baseline  Pain intensity (NRS): 6.1 vs. 6.1  Function (PSFS): 3.7 vs. 3.6  Disability (RDQ-24): 11.4 vs. 11.2  Quality of Life (SF-36 PCS and MCS): 43.9 vs. 43.8 and  52.9 vs. 54.7  Global impression of change (GPE): –1.4 vs. –1.6 | chronic/mixed subacute; mean LBP duration (mos)  (A vs. B): 74.0 vs. 100.7 | 12 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Macedo, 2012 | A vs. B (mean ± SD; adjusted treatment effect (95%  CI))  Pain intensity (NRS)  baseline: 6.1 ± 1.9 vs. 6.1 ± 2.1 (NS)  2 months: 4.1 ± 2.5 vs. 4.1 ± 2.5, 0.0 (–0.7 to 0.8), p=0.94  6 months: 4.1 ± 2.5 vs. 4.1 ± 2.7, 0.0 (–0.8 to 0.8), p=0.99  12 months: 3.7 ± 2.7 vs. 3.7 ± 2.6, 0.1 (–0.7 to 0.9), p=0.83  Function (PSFS)  baseline: 3.7 ± 1.6 vs. 3.6 ± 1.6 (NS)  2 months: 5.9 ± 2.1 vs. 5.5 ± 2.4, 0.2 (–0.5 to 0.9), p=0.53  6 months: 5.7 ± 2.3 vs. 5.7 ± 2.4, –0.2 (–0.9 to 0.5), p=0.53  12 months: 5.9 ± 2.2 vs. 6.1 ± 2.3, –0.4 (–1.1 to 0.3), p=0.25  Disability (RDQ-24)  baseline: 11.4 ± 4.8 vs. 11.2 ± 5.3 (NS)  2 months: 7.5 ± 6.4 vs. 8.0 ± 6.5, –0.8 (–2.2 to 0.7), p=0.30  6 months: 8.0 ± 7.1 vs. 8.6 ± 6.8, –0.8 (–2.3 to 0.6), p=0.26  12 months: 7.4 ± 6.7 vs. 8.0 ± 6.9, –0.6 (–2.0 to 0.9), p=0.45  Quality of Life, SF-36 PCS  baseline: 43.9 ± 10.8 vs. 43.8 ± 10.3 (NS)  2 months: 51.6 ± 12.0 vs. 51.6 ± 13.4, –0.2 (–13.7 to  3.2), p=0.89  6 months: 52.6 ± 13.0 vs. 51.2 ± 13.8, 1.1 (–2.4 to  4.6), p=0.54  12 months: 53.8 ± 12.7 vs. 53.3 ± 14.0, –0.3 (–3.8 to  3.3), p=0.88 | A vs. B  Mild adverse effects: 22.1% (19/86) vs. 19.8% (17/86), RR=1.12 (95% CI, 0.62 to 2.00), including (not reported by A vs. B):  temporary exacerbation of pain, n =  27;  increased pain of preexisting musculoskeletal conditions, n=7; development of shin splints, n=1; hip bursitis, n=1  Withdrawals (by 12 months): 8.1% (7/86) vs. 2.3% (2/86), RR=3.50 (95% CI, 0.75 to 16.37)  RRs calculated by EPC | Australia’s  National Health and Medical Research Council; the funding  source had no role in the planning or conduct of the study. | Fair | MCE and graded  activity have similar effects (no significant difference between groups for any outcome) |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Machado, 2010 | Australia  Multicenter (27) Primary care clinics | 18 to 80 years old;  present with a new episode of acute non- specific  LBP; and be able and willing to visit one of the trial physical therapists for commencement of the McKenzie treatment program within 48 h of presentation to the physician.  EXCLUSION  nerve root compromise;  ‘red flags’ for serious spinal pathology (for example, infection, fracture); spinal surgery in the past 6 months; pregnancy; severe cardiovascular or  metabolic disease; or the inability to read and understand English. | Randomized, N=148  Analyzed, N=146  Attrition, 5.5% (8/146) | A: McKenzie method + first-line care (n=73). Number of treatment  sessions at discretion of the PT, with a max of 6 session over 3 weeks; encouraged to perform the prescribed exercises at home and to follow PT's postural advice at all times; some participants received lumbar support (93%, original McKenzie lumbar roll).  B: First-line care only (n=73). Consisted of advice to  remain active and to avoid bed rest, reassurance of the favorable prognosis of acute LBP and instructions to take acetaminophen (paracetamol) on a time-contingent basis (NSAIDs not prescribed however those already on them were allow to remain on them); 3 weeks, return for followup as needed during that time |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Machado, 2010 | A vs. B  Mean age (years): 47.5 vs. 45.9  Female: 52% vs. 48% Race NR  Pain etiology NR  Referred pain to leg: 45% vs. 50% Previous LBP episode: 74% vs. 67% Baseline  Pain (NRS): 6.6 ± 1.8 vs. 6.3 ± 1.9  Function (PSFS): 3.7 ± 1.6 vs. 3.4 ± 1.8  Disability (RDQ): 13.7 ± 5.5 vs. 13.5 ± 5.3 | Acute  (defined as pain in the area between the 12th rib and buttock crease, w/w/o leg pain, of < 6 weeks duration, preceded by a period of at least 1 month without LBP in which the patient did not consult a health care practitioner).  A vs. B  < 2 weeks: 66% vs. 67%  2–6 weeks: 34% vs. 33% | 3 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Machado, 2010 | A vs. B (treatment effects [95% CI] are model-based  adjusted differences in outcomes between groups) Pain (NRS)  **1 week:** –**0.4 (–0.8 to –0.1); p=0.02** (A, n=70; B, n=69)  **3 weeks: –0.7 (–1.2 to –0.1); p=0.02** (A, n=70; B, n=68)  **Mean pain over first 7 days:** –**0.3 (–0.5 to –0.0);**  **p=0.02** (A, n=70; B, n=69) Function (PSFS)  1 week: 0.0 (–0.4 to 0.5); p=0.90 (A, n=70; B, n=68)  3 weeks: 0.0 (–0.7 to 0.8); p=0.90 (A, n=70; B, n=69)  Disability (RDQ)  1 week: –0.2 (–1.5 to 1.0); p=0.74 (A, n=70; B, n=68)  3 weeks: –0.3 (–2.3 to 1.6); p=0.74 (A, n=70; B, n=69)  Global perceived effect  1 week: 0.5 (–0.0 to 1.1); p=0.07 (A, n=70; B, n=68)  3 weeks: 0.3 (–0.3 to 0.8); p=0.33 (A, n=70; B, n=69)  Development of persistent LBP: 53% (37/70) vs. 47% (32/68); RR 1.1, 95% CI 0.8 to 1.6, p=0.49  Sought additional health care for LBP complaints: 7% (5/70) vs. 26% (18/68); RR 0.27, 95% CI 0.1 to 0.7, p=0.002 | NR | research and  development grant from the University of Sydney, Australia. | Fair | For all outcomes  except pain, the additional effects of the McKenzie method were near  zero at all time points and not statistically significant.  Authors' conclusions: A treatment program based on the McKenzie method does not produce appreciable improvements in  pain, disability, function, global perceived effect or risk of developing persistent symptoms. Patients receiving only the recommended first- line care seek more additional health care than patients receiving the McKenzie method. |

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| **Author, Year** | **Country**  **Number of Centers and Setting** | **Inclusion Criteria** | **Number**  **Randomized, Analyzed Attrition** | **Intervention** |
| Pengel, 2007 | Australia, New  Zealand Multicenter (7) PT clinics at University teach  hospitals (6) and a primary care clinic (1) | 18 to 80 years of age  with nonspecific LBP lasting for at least 6 weeks but no longer than  12 weeks. EXCLUSION  spinal surgery in the past  12 months, pregnancy, nerve root compromise, confirmed or suspected serious  spinal abnormality (for example, infection, fracture, or the cauda equina syndrome), contraindications to exercise, and poor comprehension of the English language; participants who were receiving low back pain treatment other than spinal surgery were NOT excluded | Randomized, N=260  Analyzed, N=259  Attrition: 10.8% (28/259) | A: Exercise and advice (n=63).  B: Sham exercise and advice (n=63). C: Exercise and sham advice (n=65).  D: Sham exercise and sham advice (n=68).  **Exercise**: Based on program described by Lindstrom and colleagues, to improve the abilities of participants to complete functional activities that they specified as being difficult to perform because of low back pain and includes: aerobic exercise (for example, a walking or cycling program), stretches, functional activities, activities to build speed, endurance, and coordination, and trunk- and limb-strengthening exercises. PTs used principles of cognitive-behavioral therapy and provided individualized home exercise programs;  **Sham exercise:** Sham pulsed ultrasonography (5 minutes) and sham pulsed short-wave diathermy (20 minutes);  **Advice:** Based on the program by Indahl  and colleagues and aimed to encourage a graded return to normal activities. PTs explained the benign nature of LBP, addressed any unhelpful beliefs about back pain, and emphasized that being overly careful and avoiding light activity would delay recovery;  **Sham advice:** Participants could talk about their LBP and any other problems, PT responded in a warm and empathic manner, displaying genuine interest, but did not give advice about the LBP.  The 12 exercise or sham exercise sessions were delivered over 6 weeks:  3 sessions per week in weeks 1 and 2, 2 sessions per week in weeks 3 and 4, and 1 session per week in weeks 5 and 6. In weeks 1, 2, and 4, participants also received advice or sham advice. |

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| **Author, Year** | **Study Participants** | **Duration of Pain (acute, subacute, chronic)** | **Duration of Followup** |
| Pengel, 2007 | A vs. B vs. C vs. D  Mean age (years): 50.1 vs. 51.2 vs. 48.0 vs. 50.0  Female: 46% vs. 44% vs. 46% vs. 54% Race NR  Pain etiology NR  Previous episodes of LBP: 71% vs. 69% vs. 60% vs. 65% Referred pain to legs: 29% vs. 38%, vs. 31% vs. 29% Baseline  Pain (NRS): 5.4 ± 2.2 vs. 5.5 ± 2.1 vs. 5.4 ± 1.9 vs. 5.3 ±  1.7  Function (PSFS): 3.8 ± 1.9 vs. 3.8 ± 1.8 vs. 3.7 ± 2.0 vs.  4.0 ± 1.7  Disability (RDQ): 9.1 ± 4.8 vs. 8.2 ± 4.4 vs. 8.3 ± 5.0 vs.  8.1 ± 5.6  Global perceived effect: –0.4 ± 2.3 vs. 0.2 ± 2.3 vs. –0.3 ±  2.6 vs. 0.5 ± 2.3  Depression (DASS): 7.3 ± 8.8 vs. 7.4 ± 7.7 vs. 7.1 ± 7.8 vs. 7.1 ± 7.6  Anxiety (DASS): 4.7 ± 6.7 vs. 5.2 ± 7.4) vs. 6.2 ± 7.6 vs.  5.4 ± 6.9  Stress (DASS): 10.1 ± 9.0 vs. 11.7 ± 8.7 vs. 12.6 ± 9.1 vs.  11.7 ± 10.0 | Mixed acute/subacute  A vs. B vs. C vs. D  6–8 weeks: 48% vs. 51% vs. 45% vs. 47  9–11 weeks: 34% vs. 41% vs. 38% vs. 37%  12 weeks: 18% vs. 8% vs. 17% vs. 16% | 12 months |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Pengel, 2007 | Adjusted multivariable mixed model, relative change  (95% CI)  Exercise vs. No Exercise  Pain (NRS)  **6 weeks: –0.8 (–1.3 to –0.3), p=0.004**  3 months: –0.5 (–1.1 to 0.1), p=0.092  12 months: –0.5 (–1.1 to 0.2), p=0.138  Function (PSFS)  6 weeks: 0.4 (–0.2 to 1.0), p=0.174  3 months: 0.5 (0.0 to 1.1), p=0.063  12 months: 0.5 (–0.1 to 1.0), p=0.094  Disability (RDQ):  6 weeks: –0.8 (–1.8 to 0.3), p=0.141  3 months: –0.1 (–1.2 to 1.1), p=0.901  12 months: –0.3 (–1.6 to 0.9), p=0.597  Global perceived effect  **6 weeks: 0.5 (0.1 to 1.0), p=0.017**  **3 months: 0.5 (0.1 to 1.0), p=0.030**  12 months: 0.4 (–0.1 to 1.0), p=0.134  Depression (DASS)  6 weeks: –0.7 (–2.5 to 1.2), p=0.47  3 months: –0.3 (–2.1 to 1.6), p=0.78  12 months: –0.6 (–2.6 to 1.3), p=0.51 | Mild adverse events (muscle  soreness, increased pain, tiredness, nausea, weight gain, itchy scalp,  and numbness in the legs): 8.1% (21/259)  A vs. B vs. C vs. D  15.9% (10/63) vs. 4.8% (3/63) vs.  9.2% (6/65) vs. 2.9% (2/68)  EPC calculated RR any exercise (groups A and C) vs. any sham ex or advice (Groups b and D)  RR 3.3 (95% CI 1.2 to 8.7) p =  0.0105 | National  Health and Medical Research Council of Australia and the Australasian Low Back Pain Trial Committee. The funding sources had no role in study design; collection, analysis, or interpretation  of the data; or writing of the report. | Fair | Adjustment for the  following baseline variables: currently taking pain medication, currently smoking,  currently exercising, low back pain treatment in previous  6 weeks, and previous surgery for low back pain. |

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| **Author, Year** | **Results** | **Adverse Events Including**  **Withdrawals** | **Funding**  **Source** | **Quality**  **Rating** | **Comments** |
| Pengel, 2007 (cont.) | Exercise + Advice vs. No Exercise or Advice  Pain (NRS)  **6 weeks: –1.5 (–2.2 to –0.7) ,p<0.001**  **3 months: –1.1 (–2.0 to –0.3), p=0.009**  12 months: –0.8 (–1.7 to 0.1),p=0.069  Function (PSFS)  **6 weeks: 1.1 (0.3 to 1.9), p=0.006**  **3 months: 1.3 (0.6 to 2.1), p=0.001**  **12 months: 1.1 (0.3 to 1.8), p=0.005**  Disability (RDQ):  6 weeks: –1.3 (–2.7 to 0.2), p=0.085  3 months: –1.0 (–2.6 to 0.6), p=0.20  12 months: –0.9 (–2.7 to 0.8), p=0.29  Global perceived effect  **6 weeks: 1.3 (0.7 to 1.9), p<0.001**  **3 months: 0.8 (0.2 to 1.5), p=0.017**  12 months: 0.8 (0.0 to 1.6), p=0.059  Depression (DASS)  6 weeks: 0.2 (–2.5 to 2.8), p=0.91  3 months: 0.2 (–2.4 to 2.7), p=0.91  12 months: –0.4 (–3.1 to 2.3), p=0.76 |  |  |  |  |

**Please see Appendix C. Included Studies for full study references.**