Supplementary files

Supplementary file A: Search Strategy for all databases

MEDLINE, AMED, CINAHL, and SPORTDiscus:

(exercis* OR exertion OR “physical fitness” OR sport* OR pliability OR “physical endurance” OR “physical therapy” OR rehabilitation OR exertion* OR resistance OR run* OR jog* OR treadmill* OR swim* OR bicycl* OR walk* OR muscle strength* OR (physical W3 (fitness OR therapy)) OR (physical* W2 endur*) OR ((strength* OR isometric* OR isotonic* OR isokinetic* OR aerobic* OR endurance OR weight*) N3 train*) OR (cycle* OR cycling) OR (row OR rows OR rowing) OR (skate* OR skating)) AND **(**(“Neck Pain” OR “Neck Injuries” OR neckache OR “neck ache” OR cervicodynia OR cervicalgia) OR ((injur* OR pain* OR ach* OR sore OR stiff* OR discomfort OR “chronic pain”) N3 (neck OR cervical OR cervico*))) AND **(**Randomi?ed OR randomly OR RCT OR “placebo controlled”)

EMBASE:

(exercis* OR exertion OR “physical fitness” OR sport* OR pliability OR “physical endurance” OR “physical therapy” OR rehabilitation OR exertion* OR resistance OR run* OR jog* OR treadmill* OR swim* OR bicycl* OR walk* OR “muscle strength*” OR (physical adj3 (fitness OR therapy)) OR (physical* adj2 endur*) OR ((strength* OR isometric* OR isotonic* OR isokinetic* OR aerobic* OR endurance OR weight*) adj3 train*) OR (cycle* OR cycling) OR (row OR rows OR rowing) OR (skate* OR skating)) AND (Neck Pain OR Neck Injuries OR neckache OR neck ache OR cervicodynia OR cervicalgia OR ((injur* OR pain* OR ach* OR sore OR stiff* OR discomfort OR chronic pain) adj3 (neck OR cervical OR cervico*))) AND (Randomi?ed OR randomly OR RCT OR “placebo controlled”)

PsycINFO:

(exercis* OR exertion OR physical fitness OR sport* OR pliability OR physical endurance OR physical therapy OR rehabilitation OR exertion* OR resistance OR run* OR jog* OR treadmill* OR swim* OR bicycl* OR walk* OR muscle strength* OR (physical near/3 (fitness OR therapy)) OR (physical* near/2 endur*) OR ((strength* OR isometric* OR isotonic* OR isokinetic* OR aerobic* OR endurance OR weight*) near/3 train*) OR (cycle* OR cycling) OR (row OR rows OR rowing) OR (skate* OR skating)) AND (Neck Pain OR Neck Injuries OR neckache OR neck ache OR cervicodynia OR cervicalgia OR ((injur* OR pain* OR ach* OR sore OR stiff* OR discomfort OR chronic pain) near/3 (neck OR cervical OR cervico*))) AND (Randomi?ed OR randomly OR RCT OR placebo controlled)

Cochrane Central Register of Controlled Trials:

(exercis* OR exertion OR physical fitness OR sport* OR pliability OR physical endurance OR physical therapy OR rehabilitation OR exertion* OR resistance OR run* OR jog* OR treadmill* OR swim* OR bicycl* OR walk* OR muscle strength* OR (physical NEAR/3 (fitness OR therapy)) OR (physical* NEAR/2 endur*) OR ((strength* OR isometric* OR isotonic* OR isokinetic* OR aerobic* OR endurance OR weight*) NEAR/3 train*) OR (cycle* OR cycling) OR (row OR rows OR rowing) OR (skate* OR skating)) AND ((Neck Pain OR Neck Injuries OR neckache OR neck ache OR cervicodynia OR cervicalgia) OR ((injur* OR pain* OR ach* OR sore OR stiff* OR discomfort OR chronic pain) NEAR/3 (neck OR cervical OR cervico*))) AND (Randomi?ed OR randomly OR RCT OR placebo controlled)

Scopus:

(exercis* OR exertion OR “physical fitness” OR sport* OR pliability OR “physical endurance” OR “physical therapy” OR rehabilitation OR exertion* OR resistance OR run* OR jog* OR treadmill* OR swim* OR bicycl* OR walk* OR “muscle strength”) OR ((physical W/3 (fitness OR therapy)) OR (physical* W/2 endur*) OR ((strength* OR isometric* OR isotonic* OR isokinetic* OR aerobic* OR endurance OR weight*) W/3 train*) OR (cycle* OR cycling) OR (row OR rows OR rowing) OR (skate* OR skating)) AND ((“Neck Pain” OR “Neck Injuries” OR neckache OR “neck ache” OR cervicodynia OR cervicalgia) OR ((injur* OR pain* OR ach* OR sore OR stiff* OR discomfort OR “chronic pain”) W/3 (neck OR cervical OR cervico*))) AND (Randomi?ed OR randomly OR RCT OR “placebo controlled”)

Physiotherapy Evidence Database:

Search 1:

Abstract & title: exercise neck pain

Therapy: fitness training

Problem: pain

Body part: head or neck

Sub discipline: Musculoskeletal

Topic: chronic pain

Method: clinical trial

Search 2:

Abstract & title: exercise neck pain

Therapy: strength training

Problem: pain

Body part: head or neck

Sub discipline: Musculoskeletal

Topic: chronic pain

Method: clinical trial

Supplementary file B: Summary table of all data included in the network for pain intensity

Treatment types: 1 Strengthening, 2 Multimodal, 3 PPA+Strength, 4 Motor Control, 5 Stretching, 6 Proprioceptive, 7 No treatment, 8 Prescribed PPA, 9 Strength+Stretch, 10 Balance, 11 Yoga/Pilates/Tai Chi/Qigong, 12 Strength+Motor Control, 13 ROM

			Treatment arm 1				Treatment arm 2				Treament arm 3				Treatment arm 4			
painID	*study*	*Author year*	*treat*	*y*	*sd*	*n*	*treat*	*y*	*sd*	*n*	*treat*	*y*	*sd*	*n*	*treat*	*y4*	*sd4*	*n4*
1	1	Alpayci 2017	1	-3.91	1.672692	34	7	-1.56	1.478276	31								
2	2	Andersen 2013	1	-26	22.89509	69	7	-12	24.37041	49								
3	3	Andersen 2014	1	-1.862	0.508	24	7	0.015	0.554	23								
4	4	Andersen 2012	1	-2.291	0.309	43	1	-3.02	0.355	40	1	-2.509	0.455	27	7	-1.164	0.364	48
5	5	Andersen 2008	1	-20	13.0767	18	8	-2	18.24829	16	7	-1	21.07131	8				
6	7	Beinert 2013	10	-1.68	1.645934	17	7	-0.83	2.585595	17								
7	8	Bobos 2016	4	-3.45	2.045558659	23	1	-1.65	2.082327399	22	7	-1	1.873932	22				
8	9	Caputo 2017	1	-2.86667	2.26017	18	5	-4.16667	2.592593	17								
9	11	Chiu 2005	12	-1.6	2.12838	67	7	-0.5	2.206808	78								
10	12	Cramer 2013	11	-28.6	17.10205	25	9	-12.1	22.26028	26								
11	13	deAurajo 2018	11	-5.1	1.665023	32	7	-0.28	1.905282	32								
12	14	Dellve 2011	1	-0.1	1.7	20	7	0.5	1.6	20								
13	15	Dunleavy 2016	11	-0.9	1.282012	20	11	-0.3	1.348591	19	7	-0.2	0.447338	17				
14	17	Evans 2012	1	-3.1	1.68226	89	8	-1.9	1.852026	90								
15	18	Falla 2008	4	-0.9	2.4	28	1	-1.1	2.8	29								
16	21	Falla 2013	12	-1.7	2.2	22	7	-0.3	2.1	23								
17	22	Gallego Izquierdo 2016	4	-3.49667	0.955412	14	6	-3.52667	1.274332	14								
18	23	Ghaderi 2017	4	-39.62	24.24067	20	7	-39	19.57217	20								
19	26	Hakkinen 2008	5	-32	25.14352	52	1	-37	24.37041	49								
20	27	Hoving 2012	2	-2.8	2.3	59	7	-2.6	2.4	64								

21	30	Javanshir 2015	4	-2.7	1.63	30	1	-2.32	1.19	30				
22	31	Jordan 2011	11	-31	17.47311	42	8	-30.1	22.94796	39	7	-12.4	23.64007	41
23	32	Jull 2009	4	-1.7	2	23	1	-1	3.3	23				
24	33	Jull 2002	12	-3.26	2.740219	52	7	-1.43	2.078461	48				
25	34	Karlsson 2014	9	-2.5	4.50575	34	5	-1.33333	2.566001	23				
26	36	Khosrokiani 2018	4	-2.4	1.848351	15	7	0.73	2.604304	15				
27	38	Kjellman 2002	8	-29	24.63737	23	7	-26	21.65641	26				
28	40	Lange 2013	12	-1	0.34641	27	7	0.2	0.4	28				
29	42	Lansinger 2007	11	-13.75	17.58954	60	1	-23.25	17.86016	62				
30	43	Lauche 2016	11	-21.8	22.11357	38	8	-21	18.76619	37	7	-9.7	21.83369	39
31	44	Li 2017	1	-2.86	1.130796	38	1	-2.41	0.972163	35	7	-0.34	1.104898	36
32	46	Michalsen 2012	11	-31.3	17.47598	38	8	-7.5	21.51116	39				
33	50	OLeary 2012	1	-9	16.53028	20	4	-19.2	11.85074	20	13	-10.1	11.63228	20
34	51	Ravi 2016	1	-2.8	0.750395	25	6	-3.08	0.676683	25				
35	52	Rendant 2011	8	-6.82	1.45	34	7	-1.56	1.478276	31				
36	59	Tunwattanapong 2016	5	-2.2	1.587451	48	7	-0.6	1.56205	48				
37	60	Viljanen 2003	1	-1.9	2.463737	135	7	-1.4	2.364318	130				
38	69	Ylinen 2003	1	-39	21.07130751	60	1	-34	22	59	7	-15	21.65640783	60

Supplementary file C: Summary table of all data included in the network for disability

			Treatment arm 1				Treatment arm 2				Treatment arm 3			
disabID	*study*	*Author year*	*treat*	*y*	*sd*	*n*	*treat*	*y*	*sd*	*n*	*treat*	*y*	*sd*	*n*
1	8	Bobos 2016	4	-11.4	6.956469	23	1	-4.2	5.184963	22	7	-2.4	3.880434	22
2	9	Caputo 2017	1	-7.83333	7.379577	18	5	-9	9.281455	17				
3	11	Chiu 2005	12	-0.4	0.556776	67	7	-0.3	0.556776	78				
4	12	Cramer 2013	11	-7.8	9.901515	25	9	-3.8	13.22876	26				
5	13	deAurajo 2018	11	-9.72	6.066927	32	7	-2.19	6.442911	32				
6	15	Dunleavy 2016	11	-4.3	5.662219	20	11	-4.7	5.498101	19	7	-0.3	0.447338	17
7	17	Evans 2012	1	-10.1	10.62968	89	8	-9	9.76166	90				
8	18	Falla 2008	4	-3.7	4.7	28	1	-2.8	4	29				
9	21	Falla 2013	12	-4.1	4.8	22	7	-1	4.4	23				
10	22	Gallego Izquierdo 2016	4	-3.25	2.488614	14	6	-3.28	2.753525	14				
11	23	Ghaderi 2017	4	-16	10.97133	20	7	-15.72	13.43093	20				
12	24	Griffiths 2009	7	-6.98	20.24654	37	4	-6.83	21.39445	37				
13	26	Hakkinen 2008	5	-8	10.77579	52	1	-8	10.44446	49				
14	27	Hoving 2012	2	-6	7	59	7	-5.9	7.2	64				
15	30	Javanshir 2015	4	-18.07	10.2	30	1	-14.2	11.2	30				
16	31	Jordan 2011	11	-14	11.73065	42	8	-8	15.11241	39	7	-5.1	15.01558	41
17	32	Jull 2009	4	-5	4.2	23	1	-3.5	2.3	23				
18	33	Jull 2002	12	-11.03	15.57598	52	7	-3.72	9.976613	48				
19	34	Karlsson 2014	9	-5	5.925926	34	5	-5.83333	5.185185	23				
20	36	Khosrokiani 2018	4	-17.86	11.89003	15	7	0.26	11.6042	15				
21	38	Kjellman 2002	8	-12	16	23	7	-9	14.52584	26				
22	42	Lansinger 2007	11	0	13.18038	60	1	-4.5	10.19103	62				
23	43	Lauche 2016	11	-9.3	10.73499	38	8	-7.4	9.559812	37	7	-1.8	10.1843	39
24	44	Li 2017	1	-12.53	5.708756	38	1	-12.06	6.087988	35	7	-0.34	6.435985	36
25	46	Michalsen 2012	11	-7	4.71593	38	8	24.5	6	39				

26	50	O'Leary 2012	1	-4.9	3.724245	20	4	-4.4	2.666458	20	13	-2.9	2.98161	20
27	51	Ravi 2016	1	-8.424	7.564225	25	6	-3.64	7.022052	25				
28	59	Tunwattanapong 2016	5	-7	11.54686	48	7	-2.3	13.01576	48				
29	69	Ylinen 2003	1	-24	13	60	1	-22	14.5284	59	7	-12	15	60

Supplementary file D: Details of GRADE assessment for all pairwise comparisons within the pain intensity network

Comparison	k	Prop	direct SMD [95% CI]	Quality of evidence	Indirect SMD [95% CI]	Quality of evidence	NMA SMD [95% CI]	Quality of evidence	p-value
Balance vs No treatment	1	1	-0.3829 [-2.1548;1.3889]	Very low‡*			-0.3829 [-2.1548;1.3889]	Very low‡	
Multimodal vs No treatment	1	1	-0.0845 [-1.7588;1.5899]	Very low‡			-0.0845 [-1.7588;1.5899]	Very low‡	
Motor control vs No treatment	3	0.47	-0.845 [-1.8703;0.1803]	Very low‡*	-1.9015 [-2.8725;-0.9305]	Moderate	-1.402 [-2.1070;-0.6970]	Moderate	0.1426
Prescribed PA vs No treatment	5	0.7	-0.9854 [-1.7704;-0.2004]	Low†	-0.5854 [-1.7850;0.6142]	Very low‡	-0.8655 [-1.5223;-0.2086]	Low†	0.5845
Strength vs No treatment	9	0.7	-1.3998 [-1.9805;-0.8190]	Low*	-1.1585 [-2.0380;-0.2790]	Low†	-1.3265 [-1.8111;-0.8419]	Moderate	0.6537
Strength+Motor vs No treatment	4	1	-1.1944 [-2.0585;-0.3304]	Moderate			-1.1944 [-2.0585;-0.3304]	Moderate	
Stretch vs No treatment	1	0.33	-1.0079 [-2.6989;0.6831]	Very low‡	-1.2142 [-2.3937;-0.0347]	Low†	-1.1467 [-2.1141;-0.1792]	Low†	0.8445
YPTCQ vs No treatment	5	0.68	-1.018 [-1.7924;-0.2436]	Low†	-1.761 [-2.8900;-0.6321]	Moderate	-1.2557 [-1.8943;-0.6171]	Moderate	0.2874
Motor control vs Strength	5	0.69	-0.4064 [-1.1820;0.3693]	Very low‡	0.6706 [-0.4942;1.8353]	Very low‡	-0.0755 [-0.7211;0.5701]	Very low‡	0.1315
Prescribed PA vs Strength	2	0.35	0.8472 [-0.3714;2.0657]	Very low‡	0.2536 [-0.6397;1.1468]	Very low‡	0.4611 [-0.2594;1.1815]	Very low‡	0.4413
Proprioceptive vs Strength	1	0.55	-0.3857 [-2.1154;1.3439]	Very low‡*	-0.0809 [-1.9976;1.8358]	Very low‡	-0.2489 [-1.5330;1.0352]	Very low‡	0.817
ROM vs Strength	1	0.78	-0.0797 [-1.8298;1.6704]	Very low‡	1.4512 [-1.8917;4.7941]	Very low‡	0.2496 [-1.3008;1.8001]	Very low‡	0.4265
Motor control vs Proprioceptive	1	0.52	0.0259 [-1.7705;1.8223]	Very low‡	0.3307 [-1.5236;2.1850]	Very low‡	0.1734 [-1.1168;1.4637]	Very low‡	0.817
Motor control vs ROM	1	0.78	-0.6593 [-2.4159;1.0972]	Very low‡	0.8604 [-2.4479;4.1687]	Very low‡	-0.3251 [-1.8765;1.2263]	Very low‡	0.4265
Strength vs Stretch	2	0.59	0.1431 [-1.0765;1.3628]	Very low‡	-0.6528 [-2.1286;0.8230]	Very low‡	-0.1799 [-1.1200;0.7603]	Very low‡	0.4152
Strength+Stretch vs Stretch	1	0.6	-0.299 [-2.0198;1.4219]	Very low‡*	0.9456 [-1.1569;3.0481]	Very low‡	0.2003 [-1.1314;1.5320]	Very low‡	0.3693
Prescribed PA vs YPTCQ	3	0.58	0.4231 [-0.5582;1.4044]	Very low‡	0.3446 [-0.8132;1.5025]	Very low‡	0.3903 [-0.3583;1.1389]	Very low‡	0.9193

Strength vs YPTCQ	2	0.33	-0.0993 [-1.3104;1.1118]	Very low‡	-0.0564 [-0.9154;0.8026]	Very low‡	-0.0708 [-0.7714;0.6299]	Very low‡	0.9549
Strength+Stretch vs YPTCQ	1	0.59	0.8163 [-0.9177;2.5503]	Very low‡	-0.4282 [-2.5199;1.6635]	Very low‡	0.3094 [-1.0255;1.6444]	Very low‡	0.3693
Proprioceptive vs No treatment	0	0			-1.5754 [-2.9206;-0.2303]	Low†	-1.5754 [-2.9206;-0.2303]	Low†	
ROM vs No treatment	0	0			-1.0769 [-2.6775;0.5237]	Very low‡	-1.0769 [-2.6775;0.5237]	Very low‡	
Strength+Stretch vs No treatment	0	0			-0.9463 [-2.3175;0.4248]	Very low‡	-0.9463 [-2.3175;0.4248]	Very low‡	
Balance vs Multimodal	0	0			-0.2984 [-2.7363;2.1394]	Very low‡	-0.2984 [-2.7363;2.1394]	Very low‡	
Balance vs Motor control	0	0			1.0191 [-0.8879;2.9260]	Very low‡	1.0191 [-0.8879;2.9260]	Very low‡	
Multimodal vs Motor control	0	0			1.3175 [-0.4992;3.1342]	Very low‡	1.3175 [-0.4992;3.1342]	Very low‡	
Balance vs Prescribed PA	0	0			0.4825 [-1.4072;2.3722]	Very low‡	0.4825 [-1.4072;2.3722]	Very low‡	
Multimodal vs Prescribed PA	0	0			0.781 [-1.0176;2.5796]	Very low‡	0.781 [-1.0176;2.5796]	Very low‡	
Motor control vs Prescribed PA	0	0			-0.5365 [-1.4474;0.3743]	Very low‡	-0.5365 [-1.4474;0.3743]	Very low‡	
Balance vs Proprioceptive	0	0			1.1925 [-1.0321;3.4171]	Very low‡	1.1925 [-1.0321;3.4171]	Very low‡	
Multimodal vs Proprioceptive	0	0			1.491 [-0.6568;3.6387]	Very low‡	1.491 [-0.6568;3.6387]	Very low‡	
Prescribed PA vs Proprioceptive	0	0			0.71 [-0.7450;2.1649]	Very low‡	0.71 [-0.7450;2.1649]	Very low‡	
Balance vs ROM	0	0			0.694 [-1.6938;3.0817]	Very low‡	0.694 [-1.6938;3.0817]	Very low‡	
Multimodal vs ROM	0	0			0.9924 [-1.3239;3.3088]	Very low‡	0.9924 [-1.3239;3.3088]	Very low‡	
Prescribed PA vs ROM	0	0			0.2114 [-1.4827;1.9056]	Very low‡	0.2114 [-1.4827;1.9056]	Very low‡	
Proprioceptive vs ROM	0	0			-0.4985 [-2.4616;1.4646]	Very low‡	-0.4985 [-2.4616;1.4646]	Very low‡	
Balance vs Strength	0	0			0.9436 [-0.8934;2.7805]	Very low‡	0.9436 [-0.8934;2.7805]	Very low‡	
Multimodal vs Strength	0	0			1.242 [-0.5010;2.9851]	Very low‡	1.242 [-0.5010;2.9851]	Very low‡	
Balance vs Strength+Motor	0	0			0.8115 [-1.1598;2.7828]	Very low‡	0.8115 [-1.1598;2.7828]	Very low‡	
Multimodal vs Strength+Motor	0	0			1.1099 [-0.7742;2.9941]	Very low‡	1.1099 [-0.7742;2.9941]	Very low‡	

Motor control vs Strength+Motor	0	0	-0.2076 [-1.3227;0.9076]	Very low‡	-0.2076 [-1.3227;0.9076]	Very low‡
Prescribed PA vs Strength+Motor	0	0	0.329 [-0.7564;1.4143]	Very low‡	0.329 [-0.7564;1.4143]	Very low‡
Proprioceptive vs Strength+Motor	0	0	-0.381 [-1.9798;1.2177]	Very low‡	-0.381 [-1.9798;1.2177]	Very low‡
ROM vs Strength+Motor	0	0	0.1175 [-1.7014;1.9365]	Very low‡	0.1175 [-1.7014;1.9365]	Very low‡
Strength vs Strength+Motor	0	0	-0.1321 [-1.1228;0.8586]	Very low‡	-0.1321 [-1.1228;0.8586]	Very low‡
Balance vs Strength+Stretch	0	0	0.5634 [-1.6770;2.8039]	Very low‡	0.5634 [-1.6770;2.8039]	Very low‡
Multimodal vs Strength+Stretch	0	0	0.8619 [-1.3023;3.0260]	Very low‡	0.8619 [-1.3023;3.0260]	Very low‡
Motor control vs Strength+Stretch	0	0	-0.4557 [-1.9489;1.0375]	Very low‡	-0.4557 [-1.9489;1.0375]	Very low‡
Prescribed PA vs Strength+Stretch	0	0	0.0809 [-1.3722;1.5340]	Very low‡	0.0809 [-1.3722;1.5340]	Very low‡
Proprioceptive vs Strength+Stretch	0	0	-0.6291 [-2.5011;1.2429]	Very low‡	-0.6291 [-2.5011;1.2429]	Very low‡
ROM vs Strength+Stretch	0	0	-0.1306 [-2.1941;1.9330]	Very low‡	-0.1306 [-2.1941;1.9330]	Very low‡
Strength vs Strength+Stretch	0	0	-0.3802 [-1.7568;0.9965]	Very low‡	-0.3802 [-1.7568;0.9965]	Very low‡
Strength+Motor vs Strength+Stretch	0	0	-0.2481 [-1.8688;1.3726]	Very low‡	-0.2481 [-1.8688;1.3726]	Very low‡
Balance vs Stretch	0	0	0.7637 [-1.2550;2.7825]	Very low‡	0.7637 [-1.2550;2.7825]	Very low‡
Multimodal vs Stretch	0	0	1.0622 [-0.8716;2.9959]	Very low‡	1.0622 [-0.8716;2.9959]	Very low‡
Motor control vs Stretch	0	0	-0.2554 [-1.3691;0.8584]	Very low‡	-0.2554 [-1.3691;0.8584]	Very low‡
Prescribed PA vs Stretch	0	0	0.2812 [-0.8345;1.3969]	Very low‡	0.2812 [-0.8345;1.3969]	Very low‡
Proprioceptive vs Stretch	0	0	-0.4288 [-2.0111;1.1536]	Very low‡	-0.4288 [-2.0111;1.1536]	Very low‡

ROM vs Stretch	0	0	0.0698 [-1.7352;1.8747]	Very low‡	0.0698 [-1.7352;1.8747]	Very low‡
Strength+Motor vs Stretch	0	0	-0.0478 [-1.3448;1.2493]	Very low‡	-0.0478 [-1.3448;1.2493]	Very low‡
Balance vs YPTCQ	0	0	0.8728 [-1.0106;2.7562]	Very low‡	0.8728 [-1.0106;2.7562]	Very low‡
Multimodal vs YPTCQ	0	0	1.1713 [-0.6207;2.9633]	Very low‡	1.1713 [-0.6207;2.9633]	Very low‡
Motor control vs YPTCQ	0	0	-0.1463 [-1.0424;0.7499]	Very low‡	-0.1463 [-1.0424;0.7499]	Very low‡
Proprioceptive vs YPTCQ	0	0	-0.3197 [-1.7652;1.1258]	Very low‡	-0.3197 [-1.7652;1.1258]	Very low‡
ROM vs YPTCQ	0	0	0.1788 [-1.5072;1.8649]	Very low‡	0.1788 [-1.5072;1.8649]	Very low‡
Strength+Motor vs YPTCQ	0	0	0.0613 [-1.0131;1.1357]	Very low‡	0.0613 [-1.0131;1.1357]	Very low‡
Stretch vs YPTCQ	0	0	0.1091 [-0.9600;1.1782]	Very low‡	0.1091 [-0.9600;1.1782]	Very low‡

k = Number of studies providing direct evidence, prop = proportion of direct evidence, NMA (SMD) = estimated treatment effect (SMD) in network meta-analysis, direct (SMD) = estimated treatment effect (SMD) derived from direct evidence, indirect (SMD) = estimated treatment effect (SMD) derived from indirect evidence, p = p-value of test for disagreement (difference between direct and indirect evidence)

Reasons for downgrading: †Imprecision (1 downgrade), ‡Severe imprecision (2 downgrades), *risk of bias (1 downgrade)

The p-value indicated that the findings between direct and indirect comparisons was not statistically significant and therefore no comparisons have been downgraded based on inconsistency

Supplementary file E: Details of GRADE assessment for all pairwise comparisons within the pain-related disability network

Comparison	k	prop	Direct SMD [95% CI]	Quality of evidence	Indirect SMD [95% CI]	Quality of evidence	NMA SMD [95% CI]	Quality of evidence	p-value
Multimodal vs No treatment	1	1	-0.014 [-1.3719; 1.3440]	Very low‡			-0.014 [-1.3719; 1.3440]	Very low‡	
Motor Control vs No treatment	4	0.63	-0.7316 [-1.4629; -0.0004]	Very low‡*	-1.095 [-2.0454; -0.1447]	Very low‡	-0.8668 [-1.4463; -0.2873]	Low†	0.5525
Motor Control vs Proprioceptive	1	0.51	0.0111 [-1.4948; 1.5170]	Very low‡	-0.8175 [-2.3492; 0.7143]	Very low‡	-0.3961 [-1.4700; 0.6777]	Very low‡	0.4496
Motor Control vs ROM	1	0.79	-0.4659 [-1.9201; 0.9882]	Very low‡	-1.103 [-3.8939; 1.6879]	Very low‡	-0.602 [-1.8916; 0.6877]	Very low‡	0.6915
Motor Control vs Strength	5	0.69	-0.4188 [-1.0595; 0.2219]	Very low‡	0.5482 [-0.4051; 1.5015]	Very low‡	-0.1179 [-0.6497; 0.4139]	Very low‡	0.0989
Prescribed PA vs No treatment	3	0.66	-0.3163 [-1.1241; 0.4914]	Very low‡	0.9814 [-0.1436; 2.1063]	Very low‡	0.1251 [-0.5310; 0.7813]	Very low‡	0.0663
Prescribed PA vs Strength	1	0.3	0.1074 [-1.2361; 1.4508]	Very low‡	1.1999 [0.3240; 2.0758]	Very low‡	0.874 [0.1403; 1.6077]	Very low‡	0.1818
Prescribed PA vs YPTCQ	3	0.68	1.702 [0.8569; 2.5471]	Moderate	0.3958 [-0.8290; 1.6207]	Very low‡	1.2807 [0.5851; 1.9764]	Moderate	0.0854
Proprioceptive vs Strength	1	0.56	0.6452 [-0.7843; 2.0747]	Very low‡*	-0.1834 [-1.7866; 1.4199]	Very low‡	0.2782 [-0.7888; 1.3452]	Very low‡	0.4496
ROM vs Strength	1	0.78	0.6212 [-0.8360; 2.0785]	Very low‡	-0.0131 [-2.7871; 2.7609]	Very low‡	0.484 [-0.8060; 1.7741]	Very low‡	0.6915
Strength vs No treatment	3	0.43	-1.0156 [-1.8203; -0.2110]	Very low‡	-0.546 [-1.2476; 0.1556]	Very low‡	-0.7489 [-1.2777; -0.2201]	Very low‡	0.3886
Strength vs Stretch	2	0.61	0.0633 [-0.9379; 1.0646]	Very low‡	-0.2153 [-1.4723; 1.0418]	Very low‡	-0.0448 [-0.8280; 0.7384]	Very low‡	0.734
Strength vs YPTCQ	1	0.25	-0.3804 [-1.7395; 0.9787]	Very low‡	0.6721 [-0.1170; 1.4612]	Very low‡	0.4067 [-0.2757; 1.0892]	Very low‡	0.1893
Strength+Motor vs No treatment	3	1	-0.4542 [-1.2547; 0.3463]	Very low‡			-0.4542 [-1.2547; 0.3463]	Very low‡	
Strength+Stretch vs Stretch	1	0.61	0.1457 [-1.2684; 1.5598]	Very low‡*	-0.1833 [-1.9355; 1.5690]	Very low‡	0.016 [-1.0845; 1.1164]	Very low‡	0.7746
Strength+Stretch vs YPTCQ	1	0.6	0.3361 [-1.0869; 1.7591]	Very low‡	0.6651 [-1.0800; 2.4101]	Very low‡	0.4675 [-0.6353; 1.5703]	Very low‡	0.7746
Stretch vs No treatment	1	0.36	-0.379 [-1.7508; 0.9929]	Very low‡	-0.8839 [-1.9041; 0.1363]	Very low‡	-0.7041 [-1.5227; 0.1146]	Very low‡	0.5627
YPTCQ vs No treatment	4	0.7	-0.8575 [-1.5609; -0.1542]	Very low‡	-1.8585 [-2.9386; -0.7784]	Moderate	-1.1556 [-1.7450; -0.5662]	Moderate	0.128
Multimodal vs Motor Control	0	0			0.8528 [-0.6236; 2.3292]	Very low‡	0.8528 [-0.6236; 2.3292]		
Multimodal vs Prescribed PA	0	0			-0.1391 [-1.6473; 1.3690]	Very low‡	-0.1391 [-1.6473; 1.3690]		
Multimodal vs Proprioceptive	0	0			0.4567 [-1.3195; 2.2328]	Very low‡	0.4567 [-1.3195; 2.2328]		
Multimodal vs ROM	0	0			0.2508 [-1.6660; 2.1677]	Very low‡	0.2508 [-1.6660; 2.1677]		
Multimodal vs Strength	0	0			0.7349 [-0.7224; 2.1922]	Very low‡	0.7349 [-0.7224; 2.1922]		

Multimodal vs Strength+Motor	0	0	0.4402 [-1.1362; 2.0165]	Very low‡	0.4402 [-1.1362; 2.0165]
Multimodal vs Strength+Stretch	0	0	0.6741 [-1.1014; 2.4496]	Very low‡	0.6741 [-1.1014; 2.4496]
Multimodal vs Stretch	0	0	0.6901 [-0.8955; 2.2757]	Very low‡	0.6901 [-0.8955; 2.2757]
Multimodal vs YPTCQ	0	0	1.1416 [-0.3387; 2.6220]	Very low‡	1.1416 [-0.3387; 2.6220]
Motor Control vs Prescribed PA	0	0	-0.9919 [-1.8069; -0.1769]	Very low‡	-0.9919 [-1.8069; -0.1769]
Motor Control vs Strength+Motor	0	0	-0.4126 [-1.4009; 0.5757]	Very low‡	-0.4126 [-1.4009; 0.5757]
Motor Control vs Strength+Stretch	0	0	-0.1787 [-1.4017; 1.0444]	Very low‡	-0.1787 [-1.4017; 1.0444]
Motor Control vs Stretch	0	0	-0.1627 [-1.0604; 0.7350]	Very low‡	-0.1627 [-1.0604; 0.7350]
Motor Control vs YPTCQ	0	0	0.2888 [-0.4775; 1.0552]	Very low‡	0.2888 [-0.4775; 1.0552]
Prescribed PA vs Proprioceptive	0	0	0.5958 [-0.6701; 1.8616]	Very low‡	0.5958 [-0.6701; 1.8616]
Prescribed PA vs ROM	0	0	0.39 [-1.0674; 1.8473]	Very low‡	0.39 [-1.0674; 1.8473]
Prescribed PA vs Strength+Motor	0	0	0.5793 [-0.4557; 1.6144]	Very low‡	0.5793 [-0.4557; 1.6144]
Prescribed PA vs Strength+Stretch	0	0	0.8133 [-0.4211; 2.0476]	Very low‡	0.8133 [-0.4211; 2.0476]
Prescribed PA vs Stretch	0	0	0.8292 [-0.1522; 1.8106]	Very low‡	0.8292 [-0.1522; 1.8106]
Proprioceptive vs No treatment	0	0	-0.4706 [-1.6155; 0.6742]	Very low‡	-0.4706 [-1.6155; 0.6742]
Proprioceptive vs ROM	0	0	-0.2058 [-1.8393; 1.4276]	Very low‡	-0.2058 [-1.8393; 1.4276]
Proprioceptive vs Strength+Motor	0	0	-0.0165 [-1.4134; 1.3805]	Very low‡	-0.0165 [-1.4134; 1.3805]
Proprioceptive vs Strength+Stretch	0	0	0.2175 [-1.3374; 1.7723]	Very low‡	0.2175 [-1.3374; 1.7723]
Proprioceptive vs Stretch	0	0	0.2334 [-1.0739; 1.5407]	Very low‡	0.2334 [-1.0739; 1.5407]
Proprioceptive vs YPTCQ	0	0	0.685 [-0.5511; 1.9210]	Very low‡	0.685 [-0.5511; 1.9210]
ROM vs No treatment	0	0	-0.2648 [-1.6177; 1.0880]	Very low‡	-0.2648 [-1.6177; 1.0880]
ROM vs Strength+Motor	0	0	0.1893 [-1.3826; 1.7613]	Very low‡	0.1893 [-1.3826; 1.7613]
ROM vs Strength+Stretch	0	0	0.4233 [-1.2913; 2.1379]	Very low‡	0.4233 [-1.2913; 2.1379]
ROM vs Stretch	0	0	0.4392 [-1.0549; 1.9333]	Very low‡	0.4392 [-1.0549; 1.9333]
ROM vs YPTCQ	0	0	0.8908 [-0.5407; 2.3222]	Very low‡	0.8908 [-0.5407; 2.3222]
Strength vs Strength+Motor	0	0	-0.2947 [-1.2541; 0.6647]	Very low‡	-0.2947 [-1.2541; 0.6647]
Strength vs Strength+Stretch	0	0	-0.0608 [-1.2178; 1.0962]	Very low‡	-0.0608 [-1.2178; 1.0962]

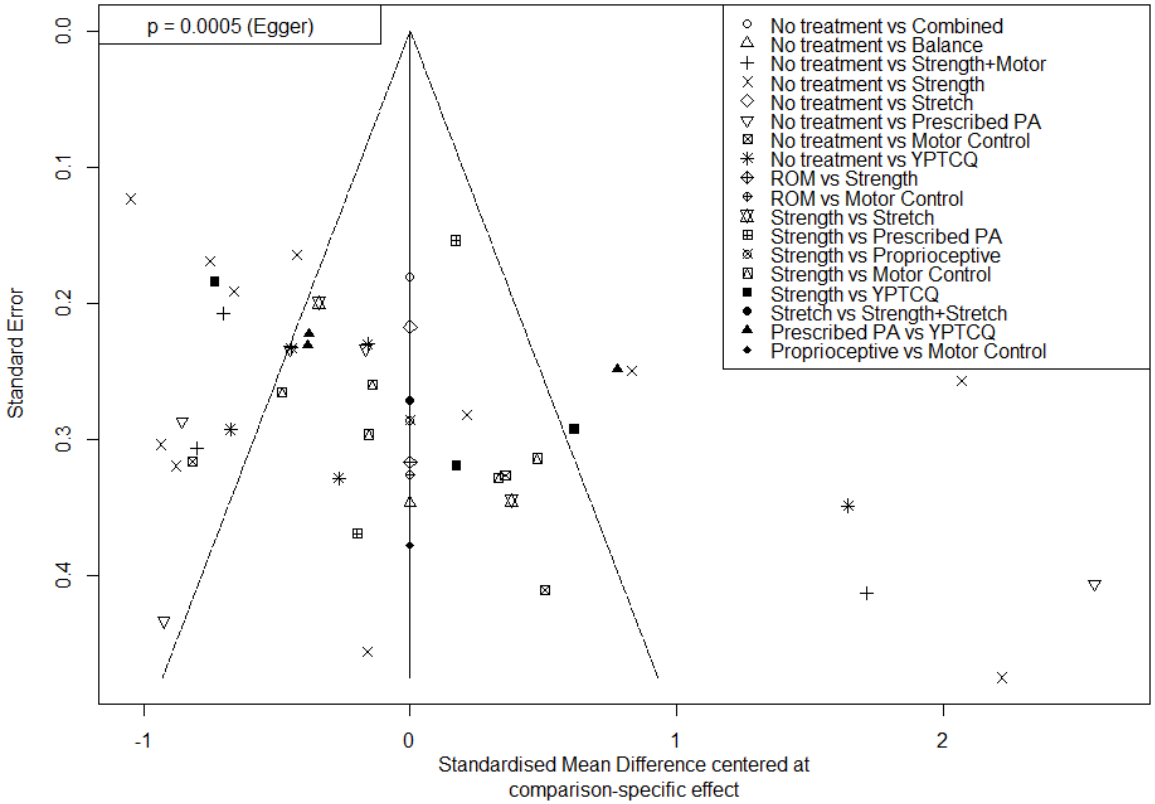
Strength+Motor vs Strength+Stretch	0	0	0.2339 [-1.1622; 1.6301]	Very low‡	0.2339 [-1.1622; 1.6301]
Strength+Motor vs Stretch	0	0	0.2499 [-0.8951; 1.3949]	Very low‡	0.2499 [-0.8951; 1.3949]
Strength+Motor vs YPTCQ	0	0	0.7014 [-0.2927; 1.6955]	Very low‡	0.7014 [-0.2927; 1.6955]
Strength+Stretch vs No treatment	0	0	-0.6881 [-1.8320; 0.4557]	Very low‡	-0.6881 [-1.8320; 0.4557]
Stretch vs YPTCQ	0	0	0.4515 [-0.4594; 1.3625]	Very low‡	0.4515 [-0.4594; 1.3625]

k = Number of studies providing direct evidence, prop = proportion of direct evidence, NMA (SMD) = estimated treatment effect (SMD) in network meta-analysis, direct (SMD) = estimated treatment effect (SMD) derived from direct evidence, indirect (SMD) = estimated treatment effect (SMD) derived from indirect evidence, p = p-value of test for disagreement (difference between direct and indirect evidence)

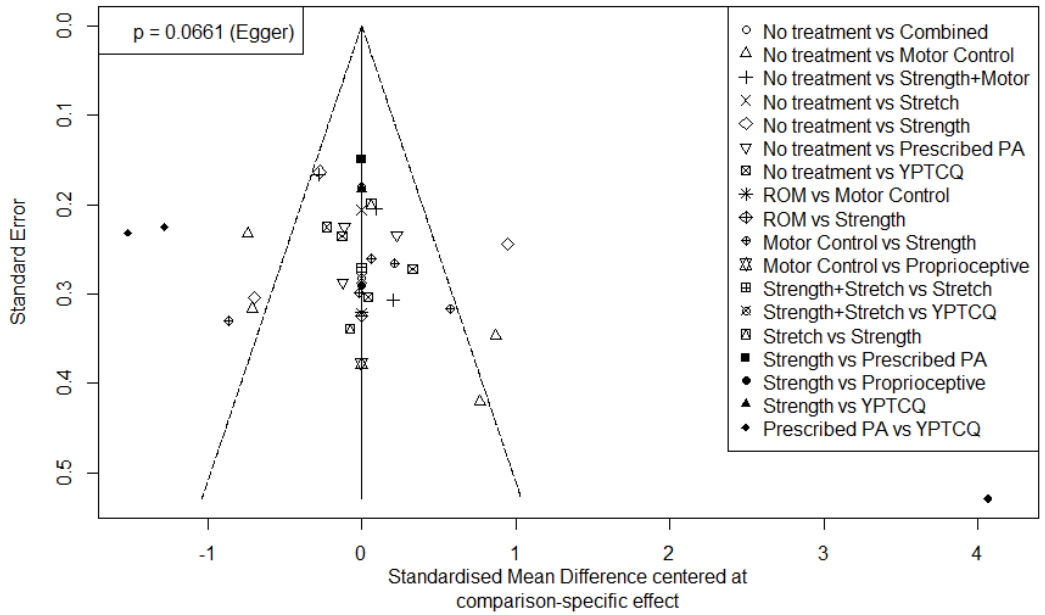
Reasons for downgrading: †Imprecision (1 downgrade), ‡Severe imprecision (2 downgrades), *risk of bias (1 downgrade)

The p-value indicated that the findings between direct and indirect comparisons was not statistically significant and therefore no comparisons have been downgraded based on inconsistency

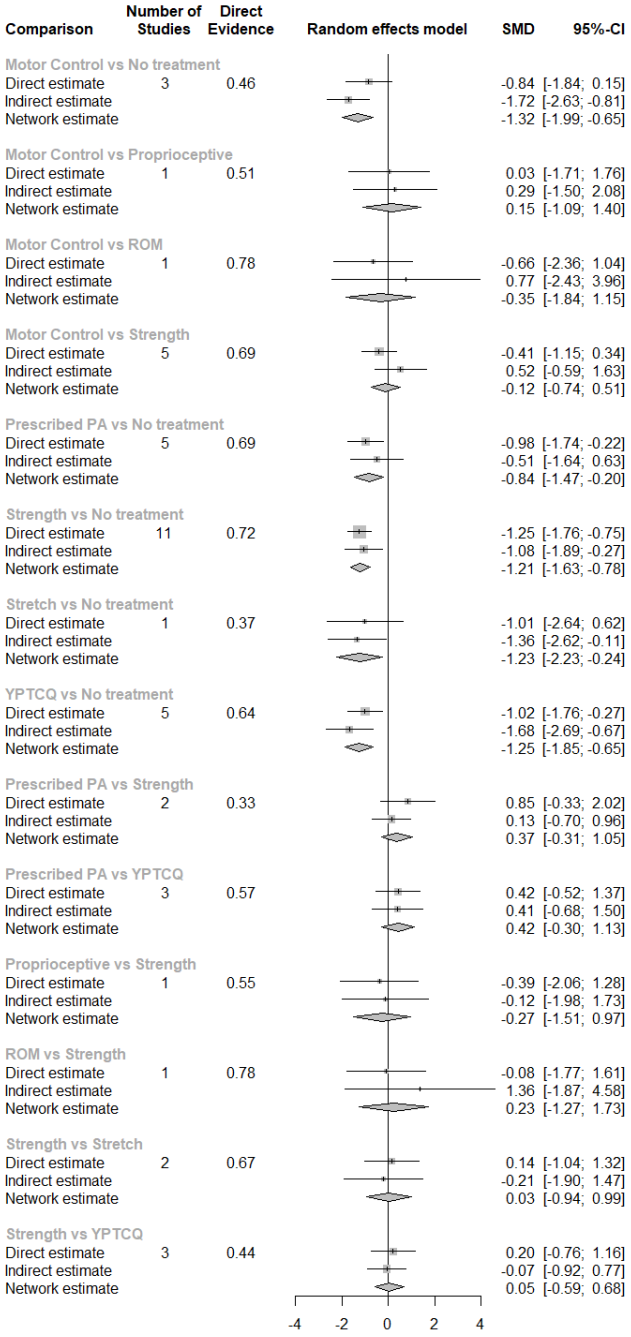
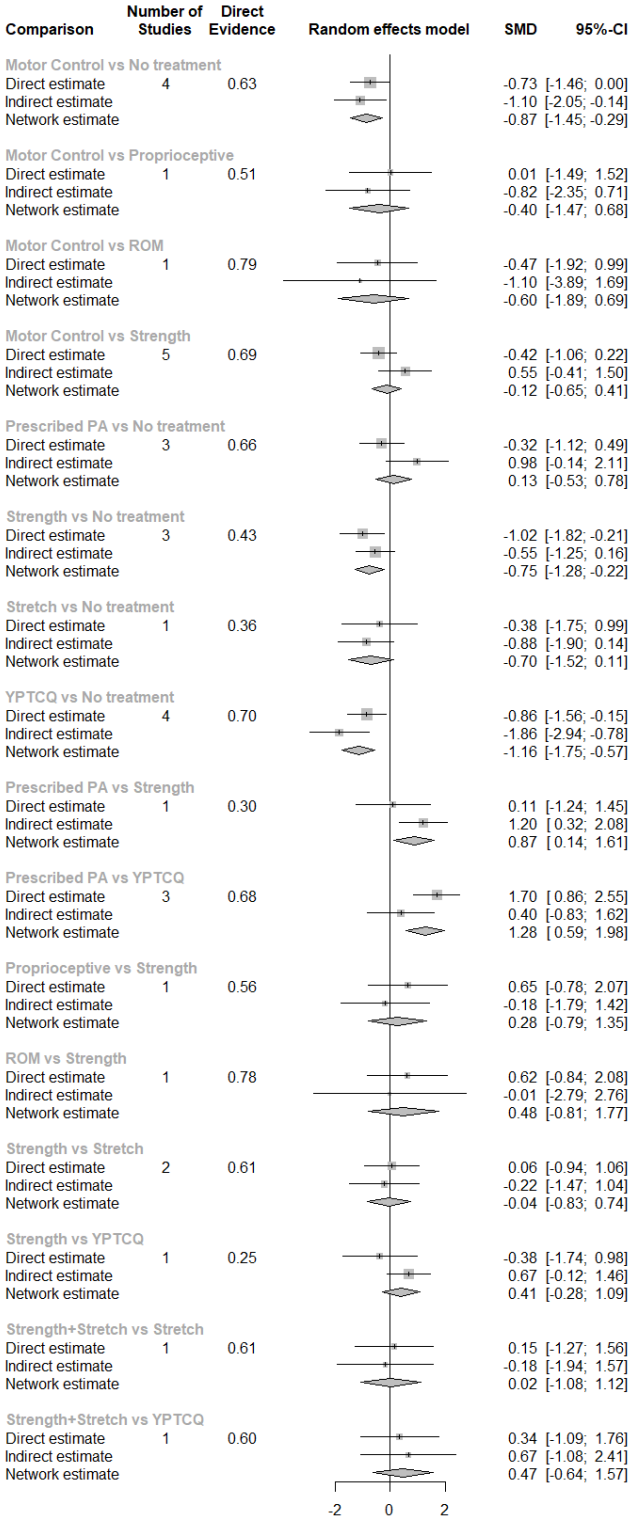
Supplementary file F: Funnel plot for the pain intensity network.



Supplementary file G: Funnel plot for the pain-related disability network.



Supplementary file H. Forest plot of direct and indirect evidence for the pain NMA.



Supplementary file I. Forest plot of direct and indirect evidence for the disability NMA.