The effectiveness of activity pacing interventions for people with chronic fatigue syndrome: a systematic review and meta-analysis.

Supplementary information

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Supplementary table 1: Example of MEDLINE database search strategy

Database	Search terms
MEDLINE	1. "chronic fatigue syndrome".mp
	2. "fatigue".mp
[mp=title, abstract, heading word,	3. "myalgic encephalitis".mp
drug trade name, original title,	4. "CFS".mp
device manufacturer, drug	5. "ME".mp
manufacturer, device trade name,	6. "post-infective fatigue".mp
keyword, floating subheading	7. "neurasthenia".mp
word, candidate term word]	8. "systemic exertion intolerance disease".mp
	9. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
	10. "activity pacing".mp
	11. "pacing".mp
	12. "adaptive pacing".mp
	13. "energy conservation".mp
	14. "behav* change".mp
	15. "cognitive behav* therapy".mp
	16. "cognitive exercise therapy".mp
	17. "graded exercise therapy".mp
	18. "exercise therapy".mp
	19. "CBT".mp
	20. "CET".mp
	21. "GET".mp
	22. "self-management".mp
	23. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
	24. 9 and 23

Supplementary table 2: Physiotherapy evidence database (PEDro) scale scores of studies included in the systematic review.

	Criterion													
Study	1*	2	3	4	5	6	7	8	9	10	11	Total		
Al-Haggar et al, 2006	1	1	1	1	0	0	0	0	1	1	1	6		
Deale et al, 1997	1	1	1	1	0	0	0	1	1	1	1	7		
Friedberg et al, 2013	1	1	1	1	0	0	0	0	1	1	1	6		
Friedberg et al, 2016	1	1	0	1	0	0	0	1	1	1	1	6		
Jason et al, 2007	1	1	0	0	0	0	0	1	1	1	1	5		
Keijmel et al., 2017	1	1	1	1	0	0	0	1	1	1	1	7		
Knoop et al, 2008	1	1	1	1	0	0	0	1	1	1	1	7		
Marques et al, 2015	1	1	0	1	0	0	0	0	1	1	1	5		
Prins et al, 2001	1	1	1	1	0	0	0	0	1	1	1	6		
Raijmakers et al., 2019	1	1	1	1	0	0	0	0	1	1	1	6		
Stulemeijer et al, 2005	1	1	1	1	0	0	0	0	1	1	1	6		
Tummers et al, 2012	1	1	1	1	0	0	0	1	1	1	1	7		
White et al, 2011	1	1	1	1	0	0	0	1	1	1	1	7		
Wiborg et al, 2015	1	1	1	1	0	0	0	0	1	1	1	6		

Criterion were rated as either "yes" = 1 or "no" = 0 and were summed to provide an overall score out of 10. Domains assessed were: 1) Eligibility criteria were specified (note: this value is not included in the final score), 2) Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received), 3) Allocation was concealed, 4) The groups were similar at baseline regarding the most important prognostic indicators, 5) There was blinding of all subjects, 6) There was blinding of all therapists who administered the therapy, 7) There was blinding of all assessors who measured at least one key outcome, 8) Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups, 9) All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by "intention to treat", 10) The results of between-group statistical comparisons are reported for at least one key outcome and 11) The study provides both point measures and measures of variability for at least one key outcome.

Supplementary figure 1: Forest plot for the effect of activity pacing on fatigue at follow-up

Fatigue (follow-up)

Study	F	Pacing	J	C	ontro	d		Weight	SMD [95% CI]
Pacing	Mean	SD	n	Mean	SD	n			
Friedberg 2013	4.19	1.58	37	5.31	1.92	74	⊢	29 %	-0.61 [-1.02, -0.21]
Friedberg 2016	6.05	1.15	78	6.42	0.81	46	⊢ •-	31%	-0.35 [-0.72, 0.01]
White 2011	23.1	7.3	153	23.8	6.6	76	⊢	40 %	-0.10 [-0.37, 0.18]
RE Model ($\tau^2 = 0.04$, Q = 4.	44, df = 2, p	= 0.108	3; I ² = 54.8	3%)			1		-0.33 [-0.62, -0.03]
Graded activity									
Deale 1997	4.1	4	30	7.2	4	30		20 %	-0.76 [-1.29, -0.24]
Prins 2001	39.1	23.7	55	45.4	15.8	70		26 %	-0.32 [-0.67, 0.04]
Raijmakers 2019	39.5	12.09	50	37.1	13.63	52		25%	0.18 [-0.20, 0.57]
White 2011	20.3	8	148	23.8	6.6	76	⊢	29 %	-0.46 [-0.74, -0.18]
RE Model ($\tau^2 = 0.10$, Q = 10).21, df = 3, p	= 0.01	68; I ² = 73	.2%)			1		-0.32 [-0.69, 0.04]
RE Model ($\tau^2 = 0.05$, Q = 14	4.73, df = 6, p	= 0.02	25; I ² = 60	.2%)			1.		-0.32 [-0.54, -0.11]
							-1.5 -0.5 0.5		

Favours Pacing

Favours control

Supplementary figure 2: Forest plot for the effect of activity pacing on fatigue compared to attention-matched controls

Fatigue (attention control) Study Weight SMD [95% CI] Pacing Control Pacing Mean SD Mean SD n n Friedberg 2013 5.4 1.2 56% -0.40 [-0.85, 0.06] 4.94 1.1 37 38 Jason 2007 44% 0.26 [-0.39, 0.90] 5.87 28 5.6 1.1 14 RE Model ($\tau^2 = 0.13$, Q = 2.62, df = 1, p = 0.1058; $I^2 = 61.8\%$) -0.11 [-0.74, 0.52] **Graded activity** Deale 1997 27% -0.07 [-0.58, 0.43] 7.2 30 7.5 4.1 30 Jason 2007 17% -0.19 [-0.83, 0.45] 5.37 1.2 29 5.6 1.1 14 Prins 2001 55% -0.40 [-0.76, -0.05] 40.9 11.39 59 46.4 15.31 65 RE Model ($\tau^2 = 0.00$, Q = 1.17, df = 2, p = 0.5585; $I^2 = 0.0\%$) -0.28 [-0.54, -0.01] RE Model ($\tau^2 = 0.00$, Q = 3.96, df = 4, p = 0.4113; $I^2 = 0.0\%$) -0.24 [-0.46, -0.03] -1

Favours Pacing

Favours control

Supplementary figure 3: Forest plot for the effect of activity pacing on physical function at follow-up

Physical Function (follow-up)

Study	Pacing	j	Contro	ol		Weight	MD [95% CI]
Pacing	Mean SD	n	Mean SD	n			
Friedberg 2013	66.3 29.73	37	56.44 25.26	74	-	28%	9.86 [-1.32, 21.04]
Friedberg 2016	46.1 32.9	80	44.07 23.28	45		31%	2.03 [-7.88, 11.94]
White 2011	45.9 24.9	153	50.8 24.7	76	⊢	41%	-4.90 [-11.71, 1.91]
RE Model ($\tau^2 = 33.67$, 0	Q = 5.14, df = 2, p = 0.0	076	7; I ² = 60.6%)				1.41 [-7.03, 9.86]
Graded activity							
Deale 1997	71.6 28	30	38.4 26.9	30	·	47%	33.20 [19.31, 47.09]
White 2011	58.2 24.1	148	50.8 24.7	76	-	53%	7.40 [0.62, 14.18]
RE Model (τ ² = 301.72,	Q = 10.70, df = 1, p =	0.0	011; I ² = 90.79	%)	· · · · · · · · · · · · · · · · · · ·	1	19.56 [-5.68, 44.80]
RE Model (τ ² = 156.75,	, Q = 25.49, df = 4, p =	0.0	000; I ² = 88.29	%)	,		8.69 [-3.14, 20.52]
					- i		
					-20 0 20 40	60	
					Favours control Favours paci	ng	

Supplementary figure 4: Forest plot for the effect of activity pacing on physical function compared to attention-matched controls

Physical Function (attention control) Study Weight MD [95% CI] Pacing Control Pacing Mean SD n Mean SD Friedberg 2013 74.8 24.4 37 67.1 22.9 71% 7.70 [-3.02, 18.42] Jason 2007 29% -0.10 [-17.06, 16.86] 61.1 23.7 28 61.2 27.7 14 RE Model ($\tau^2 = 0.00$, Q = 0.58, df = 1, p = 0.4460; $I^2 = 0.0\%$) 5.47 [-3.58, 14.53] **Graded activity** Deale 1997 53% 21.60 [7.80, 35.40] 56.2 26.2 30 34.6 28.3 Jason 2007 58.6 30.4 29 61.2 27.7 14 47% -2.60 [-20.85, 15.65] RE Model (τ^2 = 224.69, Q = 4.30, df = 1, p = 0.0382; I^2 = 76.7%) 10.27 [-13.40, 33.93] RE Model ($\tau^2 = 54.35$, Q = 5.89, df = 3, p = 0.1170; $I^2 = 50.0\%$) 7.71 [-2.57, 17.99] -40 -20 20 40 0 Favours control Favours pacing

Supplementary figure 5. Forest plot for the effect of activity pacing on depression at follow-up

				Depressi	on (fo	llow-u	p)		
Study	F	Pacing	3	-	ontro		• /	Weight	SMD [95% CI]
Pacing	Mean	SD	n	Mean	SD	n			
Friedberg 2013	14.89	11.31	37	14.03	11.16	74	-	29%	0.08 [-0.32, 0.47]
Friedberg 2016	13.75	13.23	80	18.64	9.32	45	⊢ •−	31%	-0.41 [-0.77, -0.04]
White 2011	7.2	4.5	149	7.2	4.7	76	- • →	41%	0.00 [-0.28, 0.28]
RE Model ($\tau^2 = 0.03$, Q	= 3.91, df = 2,	p = 0.1	419; ² =	48.6%)			1		-0.10 [-0.38, 0.17]
Graded activity									
Deale 1997	10.1	6.9	30	12.3	8.5	30		23%	-0.28 [-0.79, 0.23]
White 2011	6.2	3.7	143	7.2	4.7	75		77%	-0.24 [-0.53, 0.04]
RE Model (τ ² = 0.00, Q	= 0.01, df = 1,	p = 0.9	9042; I ² =	0.0%)			-		-0.25 [-0.50, -0.01]
RE Model (τ^2 = 0.01, Q	= 4.93, df = 4,	p = 0.2	2944; I ² =	20.7%)			i i		-0.16 [-0.33, 0.02]
							T i		
							-1 0		
						F	avours pacing Fa	avours contr	ol

Supplementary figure 6. Forest plot for the effect of activity pacing on depression compared to attention-matched controls

Depression (attention control)

							, ,		
Study	F	Pacing	3	С	ontro	ol		Weight	SMD [95% CI]
Pacing	Mean	SD	n	Mean	SD	n			
Friedberg 2013	13.52	9.97	37	16.41	9.55	38	⊢ •÷	57%	-0.29 [-0.75, 0.16]
Jason 2007	11.86	7.36	28	13.5	9.97	28		→ 43%	-0.18 [-0.71, 0.34]
RE Model ($\tau^2 = 0.00$, Q =	0.09, df = 1,	p = 0.7	′595; I ² =	0.0%)			-		-0.25 [-0.59, 0.10]
Graded activity									
Deale 1997	8.9	5.6	30	11.9	7.4	30	←	50%	-0.45 [-0.96, 0.06]
Jason 2007	13.95	13.08	29	13.5	9.97	28	-	→ 50%	0.04 [-0.48, 0.56]
RE Model ($\tau^2 = 0.05$, Q =	: 1.73, df = 1,	p = 0.1	887; I ² =	42.1%)			,	•4	-0.21 [-0.69, 0.27]
RE Model (τ^2 = 0.00, Q =	1.84, df = 3,	p = 0.6	058; I ² =	0.0%)			-		-0.23 [-0.48, 0.02]
							 i		
							-1 0	1	
							Favours pacing	Favours con	trol

Favours pacing Favour

Supplementary figure 7. Forest plot for the effect of activity pacing on anxiety at follow-up

Anxiety (follow-up) Study SMD [95% CI] Pacing Weight Control Pacing Mean SD Mean SD n n Friedberg 2013 24 % -0.17 [-0.57, 0.22] 12.02 11.49 14.13 12.42 37 74 Friedberg 2016 27 % -0.24 [-0.62, 0.13] 15.79 10.29 78 18.3 10.29 43 White 2011 4.2 49% -0.12 [-0.39, 0.16] 7.5 149 4.4 76 RE Model ($\tau^2 = 0.00$, Q = 0.28, df = 2, p = 0.8679; $I^2 = 0.0\%$) -0.16 [-0.36, 0.03] **Graded activity** White 2011 75 100 % -0.28 [-0.56, 0.00] 6.8 4.2 143 4.4 RE Model ($\tau^2 = 0.00$, Q = 0.73, df = 3, p = 0.8665; $I^2 = 0.0\%$) -0.20 [-0.36, -0.04] -1 Favours control Favours pacing