



Supplementary Figure 1. Example path diagram for the LGC models used in the current study. LGCs are a form of structural equation model for modeling longitudinal processes. Squares represent outcome variables at baseline, 4 weeks, and 8 weeks. Circles represent average latent intercept (I), and slope (S) components across all participants. Single-headed arrows represent fixed loadings relating the outcome variables to the latent components. Double-headed arrows represent either variance, or covariance.

Latent growth curve (LGC) models take the form:

$$Y_{ij} = I + St_i + u_{ij} + u_{sj}t_i + e_{ij}$$

where Y is the outcome score for person, j , at time, i , t_i is a vector of time points representing $[0, 4, 8]$ weeks, I is an intercept term representing the average value at $t=0$ for all participants, S is a slope term representing the average linear change of Y_{ij} over time for all participants, u_{ij} is a random intercept term representing individual participant variation in I , u_{sj} is a random slope term representing individual participant variation in S , and e_{ij} is an error term.

Supplementary Table S1. Description of the exercise prescription

Phases	Main goals	Precautions	Intervention description
Phase 1	<p>Analyze movement patterns</p> <p>Gradually exposure to movements that elicit symptoms</p> <p>Reduction of symptoms intensity/severity (eg. pain and paresthesia)</p> <p>Achieve active mobility with minimal restrictions</p>	<p>Avoid staying in the same position too long</p> <p>Avoid exercises that exacerbate pain over 5/10</p>	<p>Aim for at least 1 set of tendon gliding exercises: Wrist flexors tendon glides Wrist extensors tendon glides</p> <p>Aim for at least 1 set of neural gliding exercises: Median nerve glides Ulnar nerve glides Radial nerve glides</p> <p>Aim for at least 2 sets of articular mobility exercises: Wrist flexion and extension Wrist prono-supination Finger-to-thumb opposition Fingers extension</p> <p>Aim for at least 2 sets of stretching exercises: Wrist extensors stretch Wrist flexors stretch</p> <p>Estimated session duration: 15 minutes</p>
Phase 2	<p>Restore complete range of motion</p> <p>Increase time of exposure to wrist/hand movements</p> <p>Control of symptoms</p> <p>Increase trust in movement</p>	<p>Avoid staying in the same position too long</p>	<p>Increase the range of motion of the prescribed exercises</p> <p>Introduction of articular mobility exercises in closed kinetic chain: Kneeling wrist extension Kneeling wrist flexion</p> <p>Introduction of uni-articular strengthening exercises: Resisted finger flexion Resisted finger extension Isometric hand grip</p> <p>Increase average session time by 7 minutes (increasing sets and/or repetitions of the prescribed exercises)</p> <p>Estimated session duration: 22 minutes</p>
Phase 3	<p>Improve strength and endurance</p>	<p>Avoid staying in the same position too long</p>	<p>Increase average session time by 4 minutes</p>

	<p>Increase time exposure to wrist/hand movements</p> <p>Control of symptoms</p> <p>Gradual exposure to daily activities that elicit symptoms</p>		<p>Addition of external load for the wrist/hand gliding and mobility exercises (bands and/or free weights)</p> <p>Introduction of multi-articular and closed kinetic chain strengthening exercises: Wall push-ups Standing row Seated press-up Overhead press</p> <p>Estimated session duration: 26 minutes</p>
Phase 4	<p>Increase strength and endurance</p> <p>Gradual exposure to more demanding daily activities</p>	Avoid staying in the same position too long	<p>Increase external load for the wrist/hand gliding and mobility exercises (bands and/or free weights)</p> <p>Estimated session duration: 26 minutes</p>
Phase 5	Return to all daily activities	Avoid staying in the same position too long	Aim for 20-25 min sessions

Note: The exercise prescription was based on current available research and clinical guidelines.^{25,49,50,55,70,79}

Exercise adjustments and progression on range of motion, number of sessions, number of exercises, number of sets and repetitions were based on the existence or not of movement errors (type, timing and frequency of errors), and the level of pain and fatigue during exercises reported by the participant.

The described exercises were all prescribed for the studied wrist/hand pain conditions, except the neural gliding exercises that were solely prescribed for entrapment neuropathies (e.g. carpal tunnel syndrome).

Supplementary Table S2. Baseline characteristics of completers vs non-completers

Characteristic	Completers (N=149)	Non-completers (N=40)	p
Age (years), mean (SD)	48.20 (10.74)	43.78 (11.75)	0.029
Age categories, N (%):			0.745
<25	1 (0.7)	0 (0.0)	
25-40	45 (29.6)	14 (37.8)	
40-60	86 (56.6)	18 (48.6)	
> 60	20 (13.2)	5 (13.5)	
Sex, N (%):			0.732
Female	94 (61.8)	21 (56.8)	
Male	57 (37.5)	16 (43.2)	
Non-binary	1 (0.7)	0 (0.0)	
BMI, mean (SD)	28.42 (6.71)	29.86 (7.15)	0.250
BMI categories, N (%):			0.310
Underweight (<18.5)	1 (0.7)	1 (2.7)	
Normal (18.5-25)	53 (35.5)	9 (24.3)	
Overweight (25-30)	54 (35.5)	12 (32.4)	
Obese (30-40)	35 (23.0)	10 (27.0)	
Obese grade III (>40)	9 (5.9)	5 (13.5)	
Employment status, N (%):			0.525
Employed (part-time or full-time)	139 (91.4)	35 (94.6)	
Unemployed	13 (8.6)	2 (5.4)	
Occupation type, N (%):			0.240
White collar	42 (27.6)	14 (37.8)	
Blue collar	77 (50.7)	19 (51.4)	
Other (e.g. retired)	33 (21.7)	4 (10.8)	
Side, N (%):			0.098
right	100 (65.8)	29 (78.4)	
left	49 (32.2)	6 (16.2)	
both	3 (2.0)	2 (5.4)	

Wrist condition, N (%):			0.878
Carpal tunnel syndrome	39 (25.7)	11 (29.7)	
De Quervain's tenosynovitis	12 (7.9)	4 (10.8)	
Other tenosynovitis	3 (2.0)	1 (2.7)	
Tendinopathy	35 (23.0)	10 (27.0)	
Chronic non-specific wrist pain	24 (15.8)	4 (10.8)	
Wrist/hand osteoarthritis	14 (9.2)	2 (5.4)	
Sprain/fracture	10 (6.6)	4 (10.8)	
Systemic diseases	10 (6.6)	1 (2.7)	
Dorsal wrist syndrome	3 (2.0)	0 (0.0)	
Other	2 (1.3)	0 (0.0)	
Pain duration, N (%):			0.001
Acute (<12 weeks)	47 (30.9)	22 (59.5)	
Chronic (>12 weeks)	105 (69.1)	15 (40.5)	
Outcome measures, mean (SD)			
Pain Level	4.4 (2.0)§	4.6 (2.2)	0.568
QuickDASH	27.8 (15.7)	21.7 (12.6)	0.031
Analgesics, N (%)	37 (24.7)§	5 (13.5)	0.145
Surgery Intent	15.3 (22.1)§	10.8 (15.1)	0.151
FABQ-PA	11.0 (5.4)	11.2 (6.0)*	0.842
GAD-7	2.3 (3.2)	3.1 (4.7)	0.313
PHQ-9	2.3 (3.8)	1.8 (2.9)	0.430
WPAI Overall	16.9 (20.5)	15.2 (21.1)	0.663
WPAI Work	16.4 (20.0)	15.0 (20.5)	0.723
WPAI Activities	25.3 (23.3)	21.6 (24.0)	0.393

Abbreviations: BMI, Body mass index; QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.

§ 2 missing data; * 1 missing data

Note: Significant p-values are presented in bold.

Supplementary Table S3. Unconditional Latent Growth Curve analysis: intent-to-treat

Outcome		Intercept		Slope		Fit				
		Mean (SD)	p	Mean (SD)	p	Chi-sq (df)	p	RMSEA	CFI	SRMR
Pain Level	187	4.40 (1.47)	< .001	-0.28 (0.20)	< .001	8.67 (1)	0.003	0.201	0.49	0.093
QuickDASH	189	26.56 (15.30)	< .001	-1.73 (2.02)	< .001	1.13 (1)	0.287	0.027	1.00	0.027
Surgery Intent >0	101	25.79 (14.22)	< .001	-2.45 (0.03)	< .001	3.70 (1)	0.054	0.163	0.63	0.097
Surgery Intent	187	13.71 (14.18)	< .001	-1.15 (0.41)	< .001	3.59 (1)	0.058	0.117	0.90	0.065
FABQ-PA	188	11.07 (4.32)	< .001	-0.45 (0.59)	< .001	1.09 (1)	0.296	0.022	1.00	0.028
GAD-7 ≥5	38	8.28 (1.60)	< .001	-0.69 (0.73)	0.012	0.46 (1)	0.497	0.000	1.00	0.319
GAD-7	189	2.53 (2.78)	< .001	-0.17 (0.32)	0.001	1.60 (1)	0.206	0.056	0.99	0.043
PHQ-9 ≥5	35	8.00 (0.03)	< .001	-0.73 (0.03)	< .001	2.78 (1)	0.095	0.226	0.60	0.141
PHQ-9	189	2.24 (1.91)	< .001	-0.19 (0.03)	< .001	2.44 (1)	0.118	0.087	0.97	0.058
WPAI Overall >0	93	28.00 (18.65)	< .001	-2.39 (2.69)	< .001	3.41 (1)	0.065	0.161	0.79	0.084
WPAI Overall	158	16.22 (14.45)	< .001	-1.17 (1.58)	< .001	0.36 (1)	0.548	0.000	1.00	0.017
WPAI Work >0	92	27.66 (19.17)	< .001	-2.36 (2.89)	< .001	2.59 (1)	0.107	0.132	0.87	0.074
WPAI Work	158	15.84 (14.53)	< .001	-1.12 (1.58)	< .001	0.19 (1)	0.660	0.000	1.00	0.013
WPAI Activity >0	142	32.45 (10.39)	< .001	-2.65 (0.81)	< .001	0.35 (1)	0.556	0.000	1.00	0.023
WPAI Activity	189	24.39 (16.51)	< .001	-1.85 (1.61)	< .001	0.36 (1)	0.546	0.000	1.00	0.019

Abbreviations: QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.

Note: Significant p-values are presented in bold.

Supplementary Table S4. Intent-to-treat Conditional Latent Growth Curve Model, with body mass index, age, sex, GAD-7, and PHQ-9 as covariates

Outcome	Age		Female		BMI		White collar		Blue Collar	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Pain Level	0.02 (0.105)	0.00 (0.563)	0.98 (< .001)	-0.08 (0.241)	0.03 (0.257)	0.00 (0.447)	-0.19 (0.589)	0.08 (0.280)	-0.66 (0.073)	0.09 (0.267)
QuickDASH	0.17 (0.045)	0.00 (0.780)	11.92 (< .001)	-0.85 (0.029)	0.46 (0.002)	-0.02 (0.609)	3.12 (0.171)	-0.23 (0.644)	0.00 (0.999)	0.67 (0.139)
Surgery Intent >0	-0.17 (0.407)	0.01 (0.709)	-0.23 (0.959)	-0.47 (0.524)	0.62 (0.046)	-0.03 (0.483)	2.19 (0.617)	-0.59 (0.527)	1.59 (0.834)	-0.94 (0.309)
Surgery Intent	0.06 (0.648)	-0.01 (0.782)	2.36 (0.425)	-0.75 (0.098)	0.57 (0.020)	-0.04 (0.237)	5.04 (0.131)	-0.74 (0.171)	-3.13 (0.438)	0.11 (0.839)
FABQ-PA	-0.03 (0.388)	0.01 (0.466)	0.77 (0.368)	-0.39 (0.040)	-0.01 (0.825)	-0.01 (0.619)	0.34 (0.715)	0.04 (0.858)	-0.97 (0.329)	0.34 (0.202)
GAD-7 ≥5	Did not converge									
GAD-7	-0.05 (0.021)	0.00 (0.533)	1.23 (0.004)	-0.17 (0.043)	0.06 (0.186)	-0.01 (0.128)	1.00 (0.099)	0.06 (0.655)	0.35 (0.572)	-0.02 (0.790)
PHQ-9 ≥5	-0.06 (0.175)	0.00 (0.967)	0.24 (0.818)	-0.27 (0.238)	0.24 (0.001)	-0.03 (0.181)	3.22 (0.024)	0.00 (0.999)	0.68 (0.432)	-0.28 (0.112)
PHQ-9	-0.01 (0.577)	0.00 (0.804)	1.12 (0.014)	-0.09 (0.188)	0.14 (0.011)	-0.01 (0.093)	0.81 (0.204)	0.03 (0.768)	-0.10 (0.859)	0.01 (0.893)
WPAI Overall >0	-0.09 (0.617)	0.04 (0.333)	10.30 (0.008)	-1.15 (0.267)	0.58 (0.044)	-0.09 (0.111)	-2.35 (0.625)	1.46 (0.132)	4.90 (0.365)	-0.38 (0.627)
WPAI Overall	-0.33 (0.020)	0.05 (0.029)	7.36 (0.009)	-0.35 (0.523)	0.29 (0.209)	-0.06 (0.092)	-3.65 (0.246)	1.13 (0.042)	7.93 (0.132)	-0.47 (0.442)
WPAI Work >0	-0.10 (0.520)	0.03 (0.461)	10.09 (0.008)	-1.29 (0.227)	0.47 (0.119)	-0.08 (0.184)	-2.48 (0.559)	1.6 (0.078)	5.05 (0.349)	-0.47 (0.565)
WPAI Work	-0.32 (0.021)	0.05 (0.036)	6.96 (0.012)	-0.28 (0.620)	0.25 (0.282)	-0.05 (0.157)	-3.96 (0.196)	1.17 (0.035)	8.02 (0.121)	-0.53 (0.388)
WPAI Activity >0	-0.17 (0.219)	0.03 (0.245)	9.78 (0.002)	-0.36 (0.551)	0.40 (0.044)	-0.01 (0.820)	-7.79 (0.045)	0.47 (0.461)	0.93 (0.832)	-0.17 (0.793)
WPAI Activity	-0.23 (0.093)	0.05 (0.054)	9.88 (0.001)	-0.28 (0.606)	0.40 (0.064)	-0.02 (0.572)	-6.70 (0.059)	0.60 (0.283)	2.54 (0.571)	-0.24 (0.671)

Abbreviations: BMI, Body mass index; QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.
Note: Significant p-values are presented in bold.

Supplementary Table S5. A. Responder analysis for primary outcome (NPRS) considering the MCID of 30% of change; B. Association of baseline variables with odds of being a responder.

A.

Responded	Did not Respond	Odds Ratio (Responded)	95% CI	Probability (Responded)	z	<i>p</i>
38	16	2.38	1.35; 4.38	0.704	2.90	0.003

B.

Parameter	OR being a responder	95% CI	z	<i>p</i>
Intercept	2.20	0.81; 6.59	1.50	0.133
Age	1.03	0.97; 1.10	0.97	0.34
BMI	1.08	0.96; 1.26	1.17	0.24
Sex=Female	0.94	0.25; 3.58	-0.10	0.92
GAD-7	0.99	0.67; 1.53	-0.06	0.96
PHQ-9	1.04	0.78; 1.38	0.25	0.80

Abbreviations: BMI, Body mass index; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire.
Note: Significant *p*-values are presented in bold.

Supplementary Table S6. Unconditional Latent Growth Curve analysis of carpal tunnel syndrome subgroup (intent-to-treat)

Outcome	Intercept			Slope			Fit				
	Mean	95% - CI	p	Mean	95% - CI	p	Chi-sq (df)	p	RMSEA	CFI	SRMR
Pain Level	4.18	(3.56, 4.80)	<.001	-0.36	(-0.44, -0.28)	<.001	5.4 (1)	0.067	0.168	0.65	0.090
QuickDASH	25.15	(20.86, 29.44)	<.001	-1.79	(-2.57, -1.01)	<.001	7.62 (1)	0.022	0.216	0.86	0.135
Surgery Intent	20.07	(12.65, 27.49)	<.001	-1.77	(-2.95, -0.59)	<.001	8.9 (1)	0.012	0.240	0.27	0.151
FABQ-PA	10.08	(8.56, 11.61)	<.001	-0.42	(-0.77, -0.08)	0.016	3.73 (1)	0.155	0.121	0.91	0.130
GAD-7	2.67	(1.59, 3.76)	<.001	-0.17	(-0.31, 0.04)	0.012	4.94 (1)	0.085	0.157	0.95	0.085
PHQ-9	2.25	(1.30, 3.21)	<.001	-0.18	(-0.33, -0.04)	0.013	12.85 (1)	0.002	0.301	0.87	0.103
WPAI Overall	17.42	(10.94, 23.91)	<.001	-1.44	(-2.56, -0.31)	0.013	10.15 (1)	0.006	0.283	0.82	0.125
WPAI Work	16.51	(10.50, 22.52)	<.001	-1.31	(-0.02, 1.92)	0.011	10.11 (1)	0.006	0.282	0.82	0.126
WPAI Activity	24.62	(17.69, 31.56)	<.001	-2.20	(-3.36, -1.04)	<.001	6.2 (1)	0.045	0.187	0.84	0.119

Abbreviations: QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.

Note: Significant p-values are presented in bold.

Supplementary Table S7. Comparison of outcome changes of the carpal tunnel syndrome subgroup vs entire cohort following an intent-to-treat approach

Outcome	Carpal Tunnel Syndrome Change	Entire cohort Change	Difference	95%CI	z	p
Pain Level	-2.19	-2.26	0.07	-0.53; 0.67	-0.89	0.373
QuickDASH	-14.30	-13.84	-0.46	-6.48; 5.56	-0.29	0.775
Surgery Intent	-14.15	-9.20	-4.95	-12.88; 2.99	-1.79	0.074
FABQ-PA	-3.38	-3.57	0.19	-3.35; 3.74	-0.31	0.754
GAD-7	-1.39	-1.38	-0.01	-0.96; 0.94	-0.74	0.458
PHQ-9	-1.47	-1.53	0.06	-1.21; 1.33	0.12	0.902
WPAI Overall	-11.48	-9.34	-2.14	-8.78; 4.50	-1.30	0.193
WPAI Work	-10.45	-8.94	-1.51	-8.08; 5.05	-1.25	0.213
WPAI Activity	-17.58	-14.81	-2.77	-11.08; 5.53	-1.06	0.287

Abbreviations: QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.

Note: Significant p-values are presented in bold.

Supplementary Table S8. Conditional Latent Growth Curve Model of carpal tunnel syndrome subgroup following an intent-to-treat approach, with age, sex, and body mass index as covariates

Outcome	Age		Female		BMI		FIT				
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Chi-sq (df)	p	RMSEA	CFI	SRMR
Pain Level	0.01 (0.643)	0.01 (0.24)	0.81 (0.155)	0.19 (0.145)	0.03 (0.637)	0.01 (0.446)	17.66 (4)	0.001	0.261	0.32	0.188
QuickDASH	-0.01 (0.951)	0.05 (0.254)	8.93 (0.035)	-0.14 (0.867)	0.12 (0.763)	0.12 (0.168)	3.47 (4)	0.482	0.000	1.00	0.084
Surgery Intent	0.17 (0.663)	0 (0.994)	6.35 (0.35)	-1.71 (0.188)	0.28 (0.665)	-0.05 (0.613)	1.65 (4)	0.800	0.000	1.00	0.086
FABQ-PA	-0.16 (0.016)	0.07 (< .001)	1.47 (0.357)	0.69 (0.113)	-0.23 (0.091)	0.06 (0.135)	5.76 (4)	0.218	0.094	0.93	0.101
GAD-7	-0.15 (0.009)	0.01 (0.097)	-0.1 (0.911)	0.09 (0.298)	-0.01 (0.838)	0.02 (0.282)	24.24 (4)	< .001	0.318	0.57	0.201
PHQ-9	Did not converge										
WPAI Overall	-0.61 (0.046)	0.1 (0.024)	11.19 (0.049)	-1.72 (0.073)	-0.42 (0.341)	0.12 (0.201)	5.03 (4)	0.284	0.072	0.87	0.139
WPAI Work	-0.56 (0.062)	0.09 (0.028)	10.02 (0.067)	-1.59 (0.081)	-0.43 (0.283)	0.12 (0.185)	5.51 (4)	0.239	0.087	0.83	0.138
WPAI Activity	-0.75 (0.013)	0.1 (0.022)	0.67 (0.915)	0.55 (0.654)	-0.05 (0.93)	0.17 (0.098)	10.73 (4)	0.030	0.183	0.71	0.172

Abbreviations: BMI, Body mass index; QuickDASH, Quick Disabilities of the Arm, Shoulder and Hand questionnaire; FABQ-PA, Fear-Avoidance Beliefs Questionnaire for physical activity; GAD-7, Generalized Anxiety Disorder 7-item scale; PHQ-9, Patient Health 9-item questionnaire; WPAI, Work Productivity and Activity Impairment questionnaire.
Note: Significant p-values are presented in bold.