RESEARCH LETTER

Pain Reprocessing Therapy vs Placebo and Usual Care for Patients With Chronic Back Pain: 5-Year Follow-Up of a Randomized Clinical Trial

Effective treatments for chronic back pain (CBP) are lacking.[1] We previously reported that a novel psychological treatment, pain reprocessing therapy (PRT), led to large reductions in CBP severity, with benefits generally maintained through 1-year follow-up.[2] Here, we report clinical outcomes at the 5-year follow-up, testing the long-term durability of gains.

Supplemental content

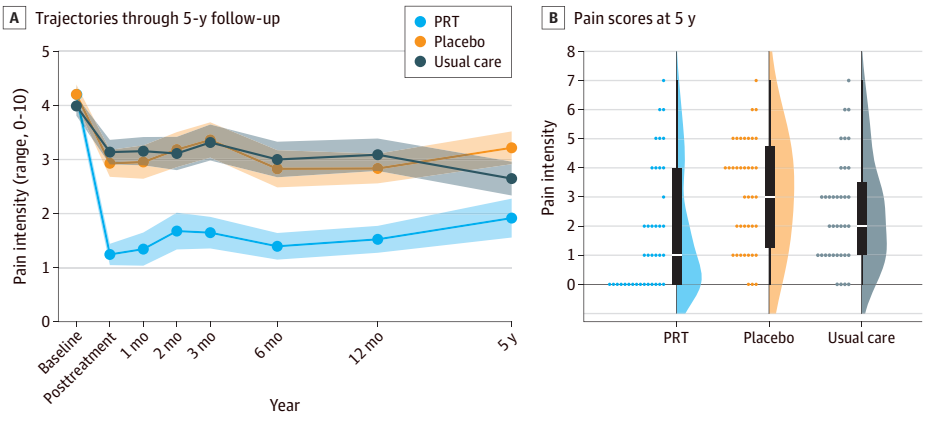
Methods | This secondary analysis of a randomized clinical trial received institutional review board approval to invite participants to complete patient-reported outcome measures in 2023, 5 years after randomization. The trial protocol has been published previously.[2] We followed the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline.

In 2017 to 2018, 151 adults with CBP recruited from community settings in the Boulder-Denver metropolitan area of Colorado reporting at least 4 of 10 pain intensity were randomized to 1 of 3 conditions: PRT, placebo, or usual care (UC) (NCT03294148). PRT participants attended 1 telehealth physician session and 8 face-to-face therapist sessions aiming to help participants reframe their CBP as due to nociplastic processes,[3] reduce fear and avoidance of pain, and regulate nonpain threats (eg, anxiety, difficult emotions).[4] Placebo participants received 1 open-label placebo injection subcutaneously into the back, accompanied by patient education about the power of placebo.[5] All participants, including UC participants, were asked to continue any ongoing CBP care.

We used Gaussian location scale mixed models to estimate treatment effects on all available 5-year outcomes (time × condition interactions), controlling for condition differences at baseline, with a random intercept per participant.[6] The primary outcome was last-week mean pain intensity (0-10 scale; location unspecified). Secondary outcomes included pain interference, depression, anxiety, anger, sleep quality, and positive and negative affect. Pain beliefs included harm beliefs and activity avoidance (Tampa Scale for Kinesiophobia 11 [TSK-11]), pain catastrophizing, belief in controllability of pain, and pain attributions items asking to what extent participants believed their pain was "due to structural issues in their body" and "due to mind or brain processes" (0-100 visual analog scale) (eMethods in Supplement 1). We also estimated the proportion of participants completely or nearly pain free (0 or 1 of 10 pain intensity) at 5 years. Statistical significance was set at 2-sided $P \leq .05$. Data were analyzed in R software version 4.5.0 (R Project for Statistical Computing) from November 2024 to April 2025.

Results | Of 151 participants, 113 (75%; mean [SD] age, 42.36 [15.54]; 62 [55%] female) provided 5-year follow-up data, with similar follow-up rates by randomization group (PRT: 38 participants; placebo: 39 participants; UC: 36 participants). PRT participants reported significantly lower pain intensity at 5 years than placebo and UC participants (**Figure** and **Table**). In the PRT group, 21 participants (55%) were nearly or completely pain free at 5 years, compared with 10 placebo participants (26%) and 13 UC participants (36%) ($\chi^2_2 = 7.28$; $P = .03$). PRT participants had significant 5-year improvements compared with placebo and UC in pain interference, depression, anger, mind-brain attributions, and TSK-11 (Table). The largest effects were found in harm beliefs (TSK-11) and in pain attributions to mind-brain processes (Table). We found no significant PRT effects at 5

Figure. Pain Intensity Through 5-Year Follow-Up



A, The pain intensity trajectories from prerandomization through 5-year follow-up; lines indicate mean values of available data at each time point and shading indicates SE. B, Distribution of pain scores at 5 years, showing median (white line), IQR (black box), and individual participants (points). PRT indicates pain reprocessing therapy.

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Table. Outcomes at 5-Year Follow-Up and Model-Estimated Group Differences

Outcome	Adjusted mean (95% CI)[a]			PRT vs placebo			PRT vs usual care		
	PRT	Placebo	Usual care	*b*	*P* value	SMD[b]	*b*	*P* value	SMD[b]
Pain intensity	1.93 (1.34 to 2.52)	3.19 (2.64 to 3.73)	2.60 (2.04 to 3.16)	−1.288	.006	−0.83	−0.956	.04	−0.62
ODI	12.47 (8.78 to 16.17)	20.09 (17.70 to 22.47)	17.18 (14.78 to 19.57)	−7.720	.02	−0.65	−4.776	.14	−0.43
BPI pain interference	1.38 (0.78 to 1.98)	2.42 (1.97 to 2.87)	2.19 (1.72 to 2.66)	−1.134	.02	−0.65	−0.964	.047	−0.57
Depression[c]	12.48 (11.42 to 13.55)	14.36 (13.00 to 15.73)	14.19 (12.79 to 15.58)	−2.421	.04	−0.48	−2.407	.045	−0.59
Sleep[c]	19.12 (17.76 to 20.47)	21.94 (20.42 to 23.45)	19.51 (18.17 to 20.86)	−2.736	.09	−0.39	−0.267	.86	−0.08
Anger[c]	10.37 (9.24 to 11.49)	11.37 (10.44 to 12.29)	11.88 (10.89 to 12.87)	−2.208	.02	−0.60	−2.532	.008	−0.77
Anxiety[c]	14.53 (13.48 to 15.59)	16.29 (14.93 to 17.65)	17.03 (15.45 to 18.61)	−1.843	.18	−0.28	−2.636	.07	−0.52
Positive affect[d]	15.99 (15.01 to 16.97)	15.50 (14.48 to 16.52)	15.56 (14.55 to 16.58)	0.376	.69	0.14	−0.316	.73	−0.06
Negative affect[d]	8.27 (7.45 to 9.09)	8.79 (7.98 to 9.60)	9.37 (8.41 to 10.32)	−1.280	.07	−0.46	−1.648	.03	−0.68
TSK	18.43 (16.64 to 20.22)	22.82 (21.40 to 24.24)	22.35 (20.82 to 23.88)	−4.468	.003	−0.82	−3.669	.02	−0.72
Belief in controllability of pain[e]	3.79 (3.52 to 4.05)	3.23 (2.95 to 3.51)	3.11 (2.85 to 3.37)	0.266	.49	0.22	0.691	.06	0.51
PCS	6.08 (4.35 to 7.82)	8.98 (7.50 to 10.45)	8.52 (6.62 to 10.41)	−3.494	.06	−0.45	−2.373	.25	−0.36
Structural attribution[f]	5.51 (4.56 to 6.46)	6.51 (5.75 to 7.27)	7.17 (6.24 to 8.09)	−1.17	.06	−0.36	−1.8	.005	−0.589
Mind-brain attribution[f]	6.11 (5.20 to 7.02)	3.36 (2.56 to 4.16)	2.50 (1.64 to 3.36)	2.87	<.001	0.9	3.76	<.001	1.177

Abbreviations: BPI, Brief Pain Inventory; ODI, Oswestry Disability Index; PCS, Pain Catastrophizing Scale; PRT, pain reprocessing therapy; SMD, standardized mean difference; SOPA, Survey of Pain Attitudes; TSK, Tampa Scale of Kinesiophobia.

[a] Means for each outcome at 5-year follow-up are adjusted using the properties of the multivariate normal distribution to estimate mean 5-year outcome values for female participants at the sample mean age (42.36 years) with sample mean pain at baseline (4.1). Condition and time were reference coded (0 vs 1), so parameter estimates represent the mean condition difference at 5 years, controlling for covariates. CIs were quantified using a participant-level bootstrap.

[b] SMDs were calculated using results from a comparable linear mixed model with Gaussian error.

[c] Assessed using Patient-Reported Outcomes Measurement Information System short forms.

[d] Assessed using the Positive and Negative Affect Scale.

[e] Assessed using the Survey of Pain Attitudes Emotions subscale

[f] The 2 attribution variables were collected only at 5 years (not at baseline); for those, values show point estimates of group means and group differences at 5 years.

years on sleep, anxiety, positive affect, pain catastrophizing, or perceived controllability of pain. There were no significant effects of placebo vs UC on any outcome at 5 years.

Differential attrition analyses found that dropout status at the 5-year follow-up was not associated with PRT response at posttreatment. Dropout status at the 5-year follow-up was not associated with PRT response at 1 year, except for sleep and belief in controllability of pain, where participants retained vs dropped in PRT had better 1-year outcomes.

Discussion | This 5-year follow-up of a randomized clinical trial found that PRT provided long-term pain reduction in CBP. Whereas improved coping with chronic pain is the goal of some psychological treatments, our findings indicate that PRT can provide durable recovery from CBP for some patients. A main limitation is that the original trial sample had low to moderate severity of CBP[2]; studies testing PRT in higher-severity samples are needed.

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Author Contributions: Dr Ashar had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
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educating on mind-body conditions. Mr Gordon reported serving as founder of the Pain Psychology Center and Healing Track outside the submitted work. Dr Wager reported being on the Scientific Advisory Board of Curable Health Inc. No other disclosures were reported.

Data Sharing Statement: See Supplement 2.

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