Topical Review

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Trauma matters: psychological interventions for comorbid psychosocial trauma and chronic pain

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There is growing interest in psychosocial trauma and chronic pain (CP). Numerous retrospective studies link trauma or posttraumatic stress disorder (PTSD) to CP,[6–9,12,35,54,78,96,97] and prospective studies indicate that earlier trauma is a risk factor for later CP.[16,27,44,45,49,57,69,76,77,86] Some scholars have offered explanations of this link, focusing on the commonalities of trauma and CP or their bidirectional relationships, such as the shared vulnerability,[14] mutual maintenance,[84] and perpetual avoidance[55] models. Others have proposed how trauma might cause, exacerbate, or maintain CP by disrupting physiological, cognitive, emotional, or interpersonal processes.[29,52,53,62,67] Unfortunately, these models have rarely informed treatment initiatives, leaving key questions unanswered: How does one define trauma in populations with CP? Is it beneficial to treat comorbid trauma or CP? What interventions effectively do so? This topical review addresses these questions.

1. Effects of psychological treatments of posttraumatic stress disorder on chronic pain

In 1980, the DSM-III introduced the diagnosis of PTSD, which sought to legitimize and destigmatize the intense reactions of military personnel, rape survivors, and others experiencing stressors outside the range of usual human experience. The criteria for PTSD have evolved, and the DSM-5 now requires exposure to actual or threatened death, serious injury, or sexual violence (either direct exposure or through witnessing, learning about, or being repeatedly exposed to aversive details), accompanied by symptoms of intrusions, avoidance, altered arousal and reactivity, and altered negative mood and cognition.[13]

Treatments for PTSD have developed independently from those for CP. Treatment guidelines routinely list PTSD and CP separately, and clinical settings typically treat PTSD and CP by different professionals, in different clinics, using disorder-specific treatments. However, the high comorbidity of PTSD and CP has led some clinicians treating PTSD to examine CP outcomes as well.[85]

The U.S. Department of Veteran Affairs has been particularly interested in studying and treating PTSD and CP.[31] For example, Otis et al.[73] combined cognitive processing therapy for PTSD and cognitive-behavioral therapy (CBT) for CP, creating the Pain and Trauma Intensive Outpatient Treatment program; initial case reports among veterans are positive for both pain and trauma symptom reduction.[47] Others working with veterans with PTSD and CP have developed interventions that integrate behavioral activation[75] or exposure and relaxation.[19] All of these approaches, however, await controlled trials. It is somewhat surprising that the recommended therapies for PTSD in the Veterans Affairs System—prolonged exposure therapy and cognitive processing therapy—have not yet been examined for their effects on CP among those treated for PTSD. A newer PTSD intervention, however, which integrates exposure, eye movement desensitization and reprocessing (EMDR), and trauma imagery rescripting—accelerated resolution therapy[30]—was shown in a randomized clinical trial (RCT) among military personnel with PTSD to yield large reductions in both PTSD symptoms and pain intensity.[48]

In civilian motor vehicle accident survivors with PTSD and CP, 3 RCTs tested trauma-focused CBT, which combines education, exposure, and self-regulation skills. All 3 trials found reductions in PTSD symptoms, but not CP.[11,17,28] A similar outcome was found in an RCT of somatic experiencing therapy for people with chronic low back pain.[10]

There have been several recent reviews of the PTSD/CP treatment literature. A meta-analysis of 11 trials (including 7 RCTs) of various psychological interventions concluded that such treatments reduced PTSD symptoms with a large effect (−0.79 SD) but pain intensity with only a medium effect (−0.51 SD; see published erratum).[38] One narrative review of 6, mostly uncontrolled, psychological interventions for refugees with PTSD and CP concluded that both PTSD and pain outcomes were improved,[80] whereas another narrative review of 7 trials of PTSD-focused treatment concluded that pain reduction was minimal.[79] Overall, these reviews suggest that PTSD-targeted treatments lead to large reductions in PTSD symptoms but smaller and less consistent improvements in CP.

2. Critique of treating posttraumatic stress disorder in chronic pain

The diagnosis of PTSD has the apparent advantage of providing a reliable operational definition, and the requirement for both exposure to a traumatic event and resulting symptoms suggests that the trauma remains unresolved and in need of intervention. Yet, there are numerous limitations of this diagnosis, of treating only patients with PTSD, and of specifically targeting PTSD in people who also have CP.

Many scholars have raised concerns about the diagnosis of PTSD,[18,34,40,66,81,91,93] including problems defining the qualifying traumatic events, the range of included or excluded symptoms, the lack of patient homogeneity, and the artificiality of a dichotomous

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categorization. Of note, trauma is broader than PTSD, although many people seem to equate PTSD with the experience of trauma more generally. There are likely several drivers of this conflation, including the hegemony of psychiatric diagnosis, funding agencies' focus on PTSD, and treatment or disability benefits that are contingent on having the diagnosis. We recognize, however, that the term "trauma" is vague and often used indiscriminately; for example, people speak of "big T and little t trauma"—the former referring to PTSD-type events and the latter to more common but still distressing events. Adversity is an even broader term than trauma and includes potentially distressing or traumatic experiences occurring throughout life, such as abuse, neglect, parental loss, family discord, assault, partner violence, workplace abuse, national displacement, and social injustice.[26] Many studies include people who have experienced a potentially traumatic event and report some PTSD symptoms but do not meet full PTSD criteria[33,38,80]; such subsyndromal, subthreshold, subclinical, or partial PTSD is clinically significant.[65] Other studies focus only on elevated posttraumatic stress symptoms without requiring a specific traumatic event.[43,70] These practices increase the number of people who qualify for PTSD-related research or treatment while also revealing concerns about the boundaries of the diagnosis of PTSD and its utility in research and treatment.

Other limitations of the diagnosis of PTSD pertain to the qualifying traumatic events. The DSM-5 diagnosis focuses on an index trauma, although earlier trauma, deprivation, adversity, or attachment difficulties are substantial risk factors for the development of PTSD on later exposure.[32] Other diagnostic systems reflect this variability. The ICD-11, for example recognizes not only PTSD stemming from index events but also complex PTSD, which can result from prolonged, chronic exposure to traumatic experiences, such as childhood abuse, torture, domestic abuse, or slavery.[94] The sociocultural context also may affect symptom presentation, such as whether the event violates culturally specific moral norms.[100] The focus of PTSD on events that are external to the person also minimizes the key role of internal processes such as needs, emotions, and defenses. For example, psychological conflicts can contribute to CP, and such conflicts usually reflect a combination of external adversity and unfulfilled, competing, or suppressed emotional/relational needs, often related to connection/communion, agency/assertion, and self-care/compassion.[37,41,46,51] Notably, most PTSD treatments do not address these developmental, contextual, and conflictual contributions.

The treatment studies of comorbid PTSD/CP described above were PTSD-centric; that is, they recruited patients with PTSD, used PTSD-focused treatments, and examined PTSD symptoms as the primary outcome. Pain, in contrast, was a secondary outcome and typically not targeted, which may have limited its reduction. We have identified 2 other approaches to treating comorbid trauma and CP that seem to redress these concerns and may lead to better CP outcomes. One approach focuses on people with CP and targets their adversities or potentially traumatic events, including pain-related trauma. A second approach treats trauma and psychological conflict in people who have a subtype of CP that is most strongly linked to cognitive/emotional factors. That is, these approaches start with CP rather than PTSD, target the trauma/adversity/conflict presumed to be driving the pain, and emphasize pain reduction.

3. Targeting life adversity, stressors, or traumatic events

Some interventions identify people with CP who report a traumatic or adverse event, or who are believed to have experienced such, and the intervention focuses on that adverse event. One such intervention is written (or verbal) emotional disclosure, which is typically self-guided, in which people write (or in some studies, speak) about the facts and feelings related to a stressful, adverse, or traumatic experience.[74] Many studies have tested emotional disclosure in patients with various types of CP, typically comparing disclosure to an emotionally neutral control exercise. A review of 18 RCTs of disclosure in CP concluded that there were small benefits in pain overall, but the effects likely depend on pain type.[61] For example, most trials in rheumatoid arthritis found little benefit of disclosure, whereas trials in fibromyalgia yielded meaningful benefits perhaps because of the greater trauma, adversity, and psychological conflicts found in people with fibromyalgia than rheumatoid arthritis.[39,92] A limitation of most of these studies is that they assumed that people with CP had trauma to disclose, but the studies did not screen to include only patients with trauma histories.

Another trauma-focused therapy tested in people with CP is EMDR. Originally developed for PTSD, EMDR has been broadened to various adversities or conflicts believed to be driving symptoms. There are several "pain protocols" for EMDR, which may target general trauma memories, the specific accident/injury experienced, or even pain-related sensations and emotions, while the patient engages in bilateral stimulation—usually eye movements, but possibly taps or tones.[83] As detailed in several reviews,[87–89] there are numerous case reports and uncontrolled case series often reporting substantial pain reduction or elimination. One RCT found that EMDR for patients reporting chronic back pain and a traumatic event reduced pain intensity at posttreatment (large effect) and 6-month follow-up (medium effect), with smaller effects on disability.[36] Another RCT reported that over 90% of EMDR-treated patients with phantom limb pain reported substantial or complete pain relief at 2-year follow-up, compared with none of the controls,[82] and another trial found that EMDR was superior to both guided imagery and no treatment control in reducing pain in rheumatoid arthritis.[71] Several other RCTs also support the efficacy of EMDR for CP.[20,63]

4. Targeting trauma or conflict in centralized or nociplastic pain conditions

Some types of CP are believed to be driven largely by central nervous system processes. Such centralized or nociplastic pain conditions include fibromyalgia; tension and migraine headaches; irritable bowel syndrome; most cases of temporomandibular, pelvic, abdominal, and back/spinal pain; and most of the somatic conditions traditionally labeled "functional" or "somatoform."[72,98] In contrast to CP that is considered secondary to pathophysiological processes (ie, nociceptive and neuropathic), centralized conditions are closely tied to PTSD, adversity, and interpersonal/emotional regulation difficulties.[6,25,92,99] Thus, studies have targeted patients with centralized CP conditions based on the assumption that most people with such pain will have trauma or conflict to address and that doing so can reduce their pain and other somatic symptoms.

Short-term psychodynamic psychotherapy has been tested on a wide range of patients. This therapy focuses on developing insight into psychological conflicts and recurrent patterns, expressing blocked emotions, and linking emotions to somatic symptoms.[5] Many RCTs of short-term psychodynamic psychotherapy for "functional" somatic disorders have been conducted, and a recent meta-analysis of 17 RCTs found that this therapy led

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to a large magnitude reduction in somatic symptoms and pain, compared with controls.[4] A subsequent meta-analysis of 37 trials of within-treatment effects found large reductions in somatic symptoms from pretreatment to posttreatment and beyond 6-month follow-up.[3] One type of psychodynamic therapy is intensive short-term dynamic psychotherapy, which specifically targets the activation of inhibited or unconscious emotions related to intrapsychic conflicts and explicitly links them to bodily changes.[1] Several uncontrolled trials of this therapy have found large reductions in pain and substantial improvements in other outcomes, such as healthcare utilization,[2,56] and several RCTs have also demonstrated substantial reductions in centralized ("medically unexplained") CP.[23,24]

Emotional awareness and expression therapy (EAET), which was derived from short-term psychodynamic as well as emotion-focused and exposure therapies, was developed specifically for patients with centralized CP. This therapy posits that pain can be reduced by integrating pain neuroscience education with awareness and expression of avoided, adaptive emotions.[58] Uncontrolled studies of EAET have found very large reductions in CP[21] and centralized somatic symptoms.[64] Two RCTs found that a single EAET session led to greater pain reduction than waitlist controls, with medium effect sizes,[22,101] and 3-session version of EAET reduced somatic symptoms in irritable bowel syndrome.[90] In a large study of fibromyalgia, group EAET was superior to fibromyalgia education on most outcomes and superior to CBT on several secondary pain-related outcomes (small-medium effects).[60] Another RCT found that group EAET surpassed CBT in reducing musculoskeletal pain intensity (large effect) and pain interference (medium effect) in older military veterans.[95]

5. Implications, limitations, and future directions

These alternative approaches to treating comorbid trauma and CP overcome some of the limitations of targeting only PTSD; they capture a larger pool of patients using simpler methods to define the population, allow for variability in event exposure and symptoms, address lifespan adversity and psychological conflicts, directly link trauma with pain, and target common mechanisms underlying both trauma and pain. Importantly, these treatments of comorbid trauma/CP emphasize the potential reversibility of both trauma symptoms and pain, and they may reduce pain more than PTSD-focused treatments do. Better quality clinical trials are needed, however, including larger samples, investigator equipoise, and outcome measures other than self-report.

There are various challenges to treating comorbid trauma and CP. First, methods to assess trauma remain undeveloped, and patient selection approaches that target only PTSD symptoms, life adversity, or psychological conflict have limitations. Second, the mechanisms of action of comorbid trauma/CP therapies remain unknown. We hypothesize, however, that a central process is reversing avoidance of feared—yet actually safe—emotional, interpersonal, and somatic experiences including pain, along with making adaptive changes in one's core beliefs about the danger of these experiences.[59] Third, research should determine which patients have the most success with these trauma/CP-focused treatments. We hypothesize that better outcomes are likely among people who have past (rather than ongoing) unresolved traumas and centralized or nociplastic pain. Finally, research is needed to understand who is receptive to such therapies and to develop and test methods to increase the motivation of those who are not.

Instead of conceptualizing trauma and CP as distinct and treating each separately—or just treating one problem in the hope that the other will improve—we encourage the use of these therapies for comorbid trauma and CP. Doing so is not only clinically efficient but also scientifically illuminating. Controlled trials that demonstrate that treating trauma substantially reduces or even eliminates pain provide evidence of the causal or contributory role that trauma plays in CP—a question that the abundant correlational research leaves unanswered. A barrier to treating comorbid trauma/CP, however, may be the presence of competing intervention frameworks. Trauma is typically "treated" psychologically with the goal of symptom remission or recovery, whereas CP is typically "managed" or "accepted" with the goal of functioning better with a chronic condition. The effective interventions for comorbid trauma and CP, however, along with emerging neuroscience on pain and emotions, such as predictive coding and interoceptive theories, challenge this dichotomy.[15,42,68] We recommend that treatments of comorbid trauma/CP include pain neuroscience, linking both trauma and CP to brain processes and emphasizing neural plasticity and the possibility of treating—rather than just managing—both trauma and pain disorders.[50,59]

Conflict of interest statement

The authors have no conflicts of interest to declare.

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References

[1] Abbass A. Reaching through resistance: advanced psychotherapy techniques. Kansas City, MO: Seven Leaves Press, 2015.
[2] Abbass A, Lovas D, Purdy A. Direct diagnosis and management of emotional factors in chronic headache patients. Cephalalgia 2008;28:1305–14.
[3] Abbass A, Lumley MA, Town J, Holmes H, Luyten P, Cooper A, Russell L, Schubiner H, De Meulemeester C, Kisely S. Short-term psychodynamic psychotherapy for functional somatic disorders: a systematic review and meta-analysis of within-treatment effects. J Psychosom Res 2021;145:110473.
[4] Abbass A, Town J, Holmes H, Luyten P, Cooper A, Russell L, Lumley MA, Schubiner H, Allinson J, Bernier D, De Meulemeesster C, Kroenke K, Kisely S. Short-term psychodynamic psychotherapy for functional somatic eisorders: a meta-analysis of randomized controlled trials. Psychother Psychosom 2020;89:363–70.
[5] Abbass AA, Kisely SR, Town JM, Leichsenring F, Driessen E, De Maat S, Gerber A, Dekker J, Rabung S, Rusalovska S, Crowe E. Short-term psychodynamic psychotherapies for common mental disorders. Cochrane Database Syst Rev 2014:CD004687.
[6] Afari N, Ahumada SM, Wright LJ, Mostoufi S, Golnari G, Reis V, Cuneo JG. Psychological trauma and functional somatic syndromes: a systematic review and meta-analysis. Psychosom Med 2014;76:2–11.
[7] Åkerblom S, Perrin S, Rivano Fischer M, McCracken LM. The relationship between posttraumatic stress disorder and chronic pain in people seeking treatment for chronic pain: the mediating role of psychological flexibility. Clin J Pain 2018;34:487–96.
[8] Alschuler KN, Otis JD. An examination of the impact of clinically significant levels of posttraumatic stress disorder symptomatology on the classification of pain as mild, moderate, or severe in a sample of veterans with chronic pain. Psychol Serv 2014;11:273–80.
[9] Anda R, Tietjen G, Schulman E, Felitti V, Croft J. Adverse childhood experiences and frequent headaches in adults. Headache 2010;50:1473–81.
[10] Andersen TE, Lahav Y, Ellegaard H, Manniche C. A randomized controlled trial of brief somatic experiencing for chronic low back pain

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and comorbid post-traumatic stress disorder symptoms. Eur J Psychotraumatol 2017;8:1331108.
[11] Andersen TE, Ravn SL, Armfield N, Maujean A, Requena SS, Sterling M. Trauma-focused cognitive behavioural therapy and exercise for chronic whiplash with comorbid posttraumatic stress disorder: a randomised controlled trial. PAIN 2021;162:1221–32.
[12] Ang DC, Wu J, Sargent C, Bair MJ. Pain experience of Iraq and Afghanistan veterans with comorbid chronic pain and posttraumatic stress. J Rehab Res Devel 2014;51:559.
[13] APA. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: American Psychiatric Association Press, 2013.
[14] Asmundson GJG, Hadjistavropolous HD. Addressing shared vulnerability for comorbid PTSD and chronic pain: a cognitive-behavioral perspective. Cog Behav Prac 2006;13:8–16.
[15] Barrett LF. How emotions are made: the secret life of the brain. New York: Houghton Mifflin Harcourt Publishing, 2017.
[16] Beal SJ, Kashikar-Zuck S, King C, Black W, Barnes J, Noll JG. Heightened risk of pain in young adult women with a history of childhood maltreatment: a prospective longitudinal study. PAIN 2020;161:156–65.
[17] Beck JG, Coffey SF, Foy DW, Keane TM, Blanchard EB. Group cognitive behavior therapy for chronic posttraumatic stress disorder: an initial randomized pilot study. Behav Ther 2009;40:82–92.
[18] Bonanno GA, Mancini AD. Beyond resilience and PTSD: mapping the heterogeneity of responses to potential trauma. Psychol Trauma 2012; 4:74–83.
[19] Bosco MA, Gallinati JL, Clark ME. Conceptualizing and treating comorbid chronic pain and PTSD. Pain Res Treat 2013;2013: 174728.
[20] Brennstuhl MJ, Tarquinio C, Bassan F. Utilisation de la thérapie EMDR—eye movement desensitization and reprocessing—dans le cadre de la douleur chronique: étude pilote. Pratiques Psychologiques 2016;22:17–29.
[21] Burger AJ, Lumley MA, Carty JN, Latsch DV, Thakur ER, Hyde-Nolan ME, Hijazi AM, Schubiner H. The effects of a novel psychological attribution and emotional awareness and expression therapy for chronic musculoskeletal pain: a preliminary, uncontrolled trial. J Psychosom Res 2016;81:1–8.
[22] Carty JN, Ziadni MS, Holmes HJ, Tomakowsky J, Peters K, Schubiner H, Lumley MA. The effects of a life stress emotional awareness and expression interview for women with chronic urogenital pain: a randomized controlled trial. Pain Med 2019;20:1321–9.
[23] Chavooshi B, Mohammadkhani P, Dolatshahee B. Efficacy of intensive short-term dynamic psychotherapy for medically unexplained pain: a pilot three-armed randomized controlled trial comparison with mindfulness-based stress reduction. Psychother Psychosom 2016;85: 123–5.
[24] Chavooshi B, Saberi M, Tavallaie SA, Sahraei H. Psychotherapy for medically unexplained pain: a randomized clinical trial comparing intensive short-term dynamic psychotherapy and cognitive-behavior therapy. Psychosom 2017;58:506–18.
[25] Clauw DJ. Diagnosing and treating chronic musculoskeletal pain based on the underlying mechanism(s). Best Pract Res Clin Rheumatol 2015; 29:6–19.
[26] Craig KD, Holmes C, Hudspith M, Moor G, Moosa-Mitha M, Varcoe C, Wallace B. Pain in persons who are marginalized by social conditions. PAIN 2020;161:261–5.
[27] Davis DA, Luecken LJ, Zautra AJ. Are reports of childhood abuse related to the experience of chronic pain in adulthood?: a meta-analytic review of the literature. Clin J Pain 2005;21:398–405.
[28] Dunne RL, Kenardy J, Sterling M. A randomized controlled trial of cognitive-behavioral therapy for the treatment of PTSD in the context of chronic whiplash. Clin J Pain 2012;28:755–65.
[29] Egloff N, Hirschi A, von Känel R. Traumatization and chronic pain: a further model of interaction. J Pain Res 2013;6:765–70.
[30] Finnegan A, Kip K, Hernandez D, McGhee S, Rosenzweig L, Hynes C, Thomas M. Accelerated resolution therapy: an innovative mental health intervention to treat post-traumatic stress disorder. J R Army Med Corps 2016;162:90–7.
[31] Fishbain DA, Pulikal A, Lewis JE, Gao J. Chronic pain types differ in their reported prevalence of post -traumatic stress disorder (PTSD) and there is consistent evidence that chronic pain is associated with PTSD: an evidence-based structured systematic review. Pain Med 2017;18: 711–35.
[32] Frewen P, Zhu J, Lanius R. Lifetime traumatic stressors and adverse childhood experiences uniquely predict concurrent PTSD, complex PTSD, and dissociative subtype of PTSD symptoms whereas recent adult non-traumatic stressors do not: results from an online survey study. Eur J Psychotraumatol 2019;10:1606625.
[33] Friedman MJ, Resick PA, Bryant RA, Brewin CR. Considering PTSD for DSM-5. Depress Anxiety 2011;28:750–69.
[34] Galatzer-Levy IR, Bryant RA. 636,120 ways to have posttraumatic stress disorder. Perspect Psychol Sci 2013;8:651–62.
[35] Gasperi M, Panizzon M, Goldberg J, Buchwald D, Afari N. Posttraumatic stress disorder and chronic pain conditions in men: a twin study. Psychosom Med 2021;83:109–17.
[36] Gerhardt A, Leisner S, Hartmann M, Janke S, Seidler GH, Eich W, Tesarz J. Eye movement desensitization and reprocessing vs. treatment-as-usual for non-specific chronic back pain patients with psychological trauma: a randomized controlled pilot study. Front Psychiatry 2016;7: 201.
[37] Ghavidel-Parsa B, Bidari A. Two sides on the fibromyalgia coin: physical pain and social pain (invalidation). Clin Rheumatol 2020;40:841–48.
[38] Goldstein E, McDonnell C, Atchley R, Dorado K, Bedford C, Brown RL, Zgierska AE. The impact of psychological interventions on posttraumatic stress disorder and pain symptoms. Clin J Pain 2019;35:703–12.
[39] Gonzalez B, Novo R, Peres R, Baptista T. Fibromyalgia and rheumatoid arthritis: personality and psychopathology differences from the Minnesota multiphasic personality inventory-2. Pers Individ Differ 2019;142:260–69.
[40] Gray MJ, Lombardo TW. Advances in the conceptualization and treatment of trauma. Behav Modif 2012;36:755–58.
[41] Hardy JK, Crofford LJ, Segerstrom SC. Goal conflict, distress, and pain in women with fibromyalgia: a daily diary study. J Psychosom Res 2011; 70:534–40.
[42] Henningsen P, Gündel H, Kop WJ, Löwe B, Martin A, Rief W, Rosmalen JGM, Schröder A, van der Feltz-Cornelis C, Van den Bergh O, EURONET-SOMA Group. Persistent physical symptoms as perceptual dysregulation: a neuropsychobehavioral model and its clinical implications. Psychosom Med 2018;80:422–31.
[43] Ho GWK, Karatzias T, Vallières F, Bondjers K, Shevlin M, Cloitre M, Ben-Ezra M, Bisson JI, Roberts NP, Astill Wright L, Hyland P. Complex PTSD symptoms mediate the association between childhood trauma and physical health problems. J Psychosom Res 2021;142:110358.
[44] Jones GT, Power C, Macfarlane GJ. Adverse events in childhood and chronic widespread pain in adult life: results from the 1958 British Birth Cohort Study. PAIN 2009;143:92–6.
[45] Jones GT, Watson KD, Silman AJ, Symmons DP, Macfarlane GJ. Predictors of low back pain in British schoolchildren: a population-based prospective cohort study. Pediatrics 2003;111:822–8.
[46] Kempke S, Luyten P, Van Wambeke P, Coppens E, Morlion B. Self-critical perfectionism predicts outcome in multidisciplinary treatment for chronic pain. Pain Pract 2014;14:309–14.
[47] Kind S, Otis JD. The interaction between chronic pain and PTSD. Curr Pain Headache Rep 2019;23:91.
[48] Kip KE, Rosenzweig L, Hernandez DF, Shuman A, Diamond DM, Girling SA, Sullivan KL, Wittenberg T, Witt AM, Lengacher CA, Anderson B, McMillan SC. Accelerated resolution therapy for treatment of pain secondary to symptoms of combat-related posttraumatic stress disorder. Eur J Psychotraumatol 2014;5:24066.
[49] Kivimäki M, Leino-Arjas P, Virtanen M, Elovainio M, Keltikangas-Järvinen L, Puttonen S, Vartia M, Brunner E, Vahtera J. Work stress and incidence of newly diagnosed fibromyalgia: prospective cohort study. J Psychosom Res 2004;57:417–22.
[50] Kohns DJ, Urbanik CP, Geisser ME, Schubiner H, Lumley MA. The effects of a pain psychology and neuroscience self-evaluation internet intervention: a randomized controlled trial. Clin J Pain 2020;36:683–92.
[51] Landa A, Fallon BA, Wang Z, Duan Y, Liu F, Wager TD, Ochsner K, Peterson BS. When it hurts even more: the neural dynamics of pain and interpersonal emotions. J Psychosom Res 2020;128:109881.
[52] Landa A, Peterson BS, Fallon BA. Somatoform pain: a developmental theory and translational research review. Psychosom Med 2012;74: 717–27.
[53] Lane RD, Anderson FS, Smith R. Biased competition favoring physical over emotional pain: a possible explanation for the link between early adversity and chronic pain. Psychosom Med 2018;80:880–90.
[54] Leserman J. Sexual abuse history: prevalence, health effects, mediators, and psychological treatment. Psychosom Med 2005;67: 906–15.
[55] Liedl A, Knaevelsrud C. PTSD and chronic pain: development, maintenance and comorbidity—a review. Schmerz 2008;22:644–51.
[56] Lilliengren P, Cooper A, Town JM, Kisely S, Abbass A. Clinical- and cost-effectiveness of intensive short-term dynamic psychotherapy for chronic pain in a tertiary psychotherapy service. Australas Psychiatry 2020;28: 414–17.
[57] Linton SJ. A prospective study of the effects of sexual or physical abuse on back pain. PAIN 2002;96:347–51.

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[58] Lumley MA, Schubiner H. Emotional awareness and expression therapy for chronic pain: rationale, principles and techniques, evidence, and critical review. Curr Rheumatol Rep 2019;21:30.
[59] Lumley MA, Schubiner H. Psychological therapy for centralized pain: an integrative assessment and treatment model. Psychosom Med 2019; 81:114–24.
[60] Lumley MA, Schubiner H, Lockhart NA, Kidwell KM, Harte S, Clauw DJ, Williams DA. Emotional awareness and expression therapy, cognitive-behavioral therapy, and education for fibromyalgia: a cluster-randomized controlled trial. PAIN 2017;158:2354–63.
[61] Lumley MA, Sklar ER, Carty JN. Emotional disclosure interventions for chronic pain: from the laboratory to the clinic. Transl Behav Med 2017;2: 73–81.
[62] Luyten P, Van Houdenhove B, Lemma A, Target M, Fonagy P. Vulnerability for functional somatic disorders: a contemporary psychodynamic approach. J Psychother Integr 2013;23:250–62.
[63] Marcus SV. Phase 1 of integrated EMDR—an abortive treatment for migraine headaches. J EMDR Pract Res 2008;2:15–25.
[64] Maroti D, Ek J, Widlund RM, Schubiner H, Lumley MA, Lilliengren P, Bileviciute-Ljungar I, Ljótsson B, Johansson R. Internet-administered emotional awareness and expression therapy for somatic symptom disorder with centralized symptoms: a preliminary efficacy trial. Front Psychiatry 2021;12:620359.
[65] Marshall RD, Olfson M, Hellman F, Blanco C, Guardino M, Struening EL. Comorbidity, impairment, and suicidality in subthreshold PTSD. Am J Psychiatry 2001;158:1467–73.
[66] McHugh PR, Treisman G. PTSD: a problematic diagnostic category. J Anxiety Disord 2007;21:211–22.
[67] McLean SA, Clauw DJ, Abelson JL, Liberzon I. The development of persistent pain and psychological morbidity after motor vehicle collision: integrating the potential role of stress response systems into a biopsychosocial model. Psychosom Med 2005;67:783–90.
[68] Moseley GL, Butler DS. Fifteen years of explaining pain: the past, present, and future. J Pain 2015;16:807–13.
[69] Mustard CA, Kalcevich C, Frank JW, Boyle M. Childhood and early adult predictors of risk of incident back pain: Ontario Child Health Study 2001 follow-up. Am J Epidemiol 2005;162:779–86.
[70] Nelson S, Beveridge JK, Mychasiuk R, Noel M. Adverse childhood experiences (ACEs) and internalizing mental health, pain, and quality of life in youth with chronic pain: a longitudinal examination. J Pain 2021. doi.org/10.1016/j.jpain.2021.03.143 [Epub ahead of print].
[71] Nia NG, Afrasiabifar A, Behnammoghadam M. Comparing the effect of eye movement desensitization and reprocessing (EMDR) with guided imagery on pain severity in patients with rheumatoid arthritis. J Pain Res 2018;11:2107–13.
[72] Nijs J, Apeldoorn A, Hallegraeff H, Clark J, Smeets R, Malfliet A, Girbes EL, De Kooning M, Ickmans K. Low back pain: guidelines for the clinical classification of predominant neuropathic, nociceptive, or central sensitization pain. Pain Physician 2015;18:E333–46.
[73] Otis JD, Keane TM, Kerns RD, Monson C, Scioli E. The development of an integrated treatment for veterans with comorbid chronic pain and posttraumatic stress disorder. Pain Med 2009;10:1300–11.
[74] Pennebaker JW, Smyth JM. Opening up by writing it down: how expressive writing improves health and eases emotional pain. New York: Guilford Press, 2016.
[75] Plagge JM, Lu MW, Lovejoy TI, Karl AI, Dobscha SK. Treatment of comorbid pain and PTSD in returning veterans: a collaborative approach utilizing behavioral activation. Pain Med 2013;14:1164–72.
[76] Power C, Frank J, Hertzman C, Schierhout G, Li L. Predictors of low back pain onset in a prospective British study. Am J Public Health 2001; 91:1671–8.
[77] Raphael KG, Widom CS. Post-traumatic stress disorder moderates the relation between documented childhood victimization and pain 30 years later. PAIN 2011;152:163–9.
[78] Rauch SA, Grunfeld TE, Yadin E, Cahill SP, Hembree E, Foa EB. Changes in reported physical health symptoms and social function with prolonged exposure therapy for chronic posttraumatic stress disorder. Depress Anxiety 2009;26:732–8.
[79] Reyes-Perez A, Ruiz-Parraga GT, Serrano-Ibanez ER, Ramirez-Maestre C, Esteve R, Lopez-Martinez AE. Psychological intervention for post-traumatic stress disorder cormorbid to chronic musculoskeletal and primary pain: a systematic review. Revista Mexicana De Psicologia 2020;37:77–91.
[80] Rometsch-Ogioun El Sount C, Windthorst P, Denkinger J, Ziser K, Nikendei C, Kindermann D, Ringwald J, Renner V, Zipfel S, Junne F. Chronic pain in refugees with posttraumatic stress disorder (PTSD): a systematic review on patients' characteristics and specific interventions. J Psychosom Res 2019;118:83–97.
[81] Rosen GM, Lilienfeld SO. Posttraumatic stress disorder: an empirical evaluation of core assumptions. Clin Psychol Rev 2008;28:837–68.
[82] Rostaminejad A, Behnammoghadam M, Rostaminejad M, Behnammoghadam Z, Bashti S. Efficacy of eye movement desensitization and reprocessing on the phantom limb pain of patients with amputations within a 24-month follow-up. Int J Rehabil Res 2017; 40:209–14.
[83] Shapiro F. Eye movement desensitization and reprocessing (EMDR) therapy: basic principles, protocols, and procedures. New York: Guilford Publications, 2017.
[84] Sharp TJ, Harvey AG. Chronic pain and posttraumatic stress disorder: mutual maintenance? Clin Psychol Rev 2001;21:857–77.
[85] Shipherd JC, Keyes M, Jovanovic T, Ready DJ, Baltzell D, Worley V, Gordon-Brown V, Hayslett C, Duncan E. Veterans seeking treatment for posttraumatic stress disorder: what about comorbid chronic pain? J Rehab Res Develop 2007;44:153–66.
[86] Suri P, Boyko EJ, Smith NL, Jarvik JG, Jarvik GP, Williams FMK, Williams R, Haselkorn J, Goldberg J. Post-traumatic stress disorder symptoms are associated with incident chronic back pain: a longitudinal twin study of older male veterans. Spine (Phila PA 1976) 2019;44:1220–7.
[87] Tefft AJ, Jordan IO. Eye movement desensitization reprocessing as treatment for chronic pain syndromes: a literature review. J Am Psychiatr Nurses Assoc 2016;22:192–214.
[88] Tesarz J, Leisner S, Gerhardt A, Janke S, Seidler GH, Eich W, Hartmann M. Effects of eye movement desensitization and reprocessing (EMDR) treatment in chronic pain patients: a systematic review. Pain Med 2014; 15:247–63.
[89] Tesarz J, Wicking M, Bernardy K, Seidler GH. EMDR therapy's efficacy in the treatment of pain. J EMDR Pract Res 2019;13:337–44.
[90] Thakur ER, Holmes HJ, Lockhart NA, Carty JN, Ziadni MS, Doherty HK, Lackner JM, Schubiner H, Lumley MA. Emotional awareness and expression training improves irritable bowel syndrome: a randomized controlled trial. Neurogastroenterol Motil 2017;29:e13143.
[91] van der Kolk BA, Roth S, Pelcovitz D, Sunday S, Spinazzola J. Disorders of extreme stress: the empirical foundation of a complex adaptation to trauma. J Traum Stress 2005;18:389–99.
[92] Walker EA, Keegan D, Gardner G, Sullivan M, Bernstein D, Katon WJ. Psychosocial factors in fibromyalgia compared with rheumatoid arthritis: II. Sexual, physical, and emotional abuse and neglect. Psychosom Med 1997;59:572–7.
[93] Weathers FW, Keane TM. The criterion a problem revisited: controversies and challenges in defining and measuring psychological trauma. J Trauma Stress 2007;20:107–21.
[94] World Health Organization. International statistical classification of diseases and related health problems (11th ed.), 2019. Available at: https://icd.who.int/.
[95] Yarns BC, Lumley MA, Cassidy JT, Steers WN, Osato S, Schubiner H, Sultzer DL. Emotional awareness and expression therapy achieves greater pain reduction than cognitive behavioral therapy in older adults with chronic musculoskeletal pain: a preliminary randomized comparison trial. Pain Med 2020;21:2811–22.
[96] You DS, Meagher MW. Childhood aversity and pain sensitization. Psychosom Med 2016;78:1084–93.
[97] You DS, Meagher MW. Childhood adversity and pain facilitation. Psychosom Med 2018;80:869–79.
[98] Yunus MB. Fibromyalgia and overlapping disorders: the unifying concept of central sensitivity syndromes. Semin Arthritis Rheum 2007;36:339–56.
[99] Yunus MB. Central sensitivity syndromes: a new paradigm and group nosology for fibromyalgia and overlapping conditions, and the related issue of disease versus illness. Semin Arthritis Rheum 2008;37:339–52.
[100] Zefferman MR, Mathew S. Combat stress in a small-scale society suggests divergent evolutionary roots for posttraumatic stress disorder symptoms. Proc Natl Acad Sci U S A 2021;118:e2020430118.
[101] Ziadni MS, Carty JN, Doherty HK, Porcerelli JH, Rapport LJ, Schubiner H, Lumley MA. A life-stress, emotional awareness, and expression interview for primary care patients with medically unexplained symptoms: a randomized controlled trial. Health Psychol 2018;37: 282–90.

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