

Comorbid Chronic Pain and PTSD: The Case for Yoga as a Simultaneous Treatment

SPOTLIGHT ON PAIN MANAGEMENT

MARCH 7, 2023

BELLE ZACCARI, PSYD

VA PORTLAND HEALTH CARE SYSTEM / OREGON HEALTH & SCIENCE UNIVERSITY



Disclosures

I have no conflicts of interest or disclosures

Objectives

1. Summarize harms associated with comorbid chronic pain and PTSD
2. Review conceptual models and treatment models of this comorbidity
3. Examine the potential of yoga as a simultaneous treatment for chronic pain and PTSD

By the Numbers

CHRONIC PAIN ¹⁻²

1/3 of the general population is affected by chronic pain

50% of the Veteran population endorses chronic musculoskeletal pain

- Up to 50% of those may also experience PTSD symptoms ¹⁻²

PTSD ³⁻⁷

20-30% of Vietnam era

15-25% of Operation Desert Storm

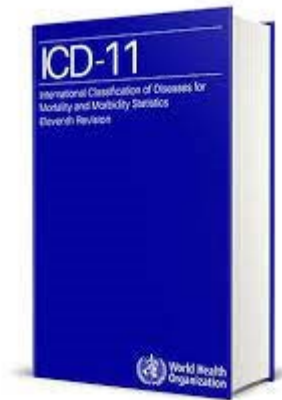
11-25% of OEF/OIF/OND

66-80% of those seeking care for PTSD have chronic pain

Diagnostic Criteria

CHRONIC PAIN

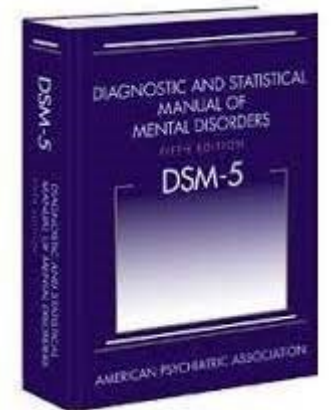
- Recurrent pain
- > 3 mo. duration
 - Nociceptive
 - Neuropathic
 - Nociplastic⁸⁻⁹
- Included Disorders
 1. **chronic primary pain (e.g. fibromyalgia, back pain)**
 2. chronic cancer pain
 3. chronic post-traumatic and postsurgical pain
 4. chronic neuropathic pain
 5. chronic headache and orofacial pain
 6. chronic visceral pain
 7. chronic musculoskeletal pain



PTSD

DSM-5 PTSD Symptom Criteria:

- Re-experiencing
- Avoidance
- Changes to Mood and Cognitions
- Hyperarousal



ICD-11 Complex PTSD adds Disturbances of self organization:

- Emotion Dysregulation
- Interpersonal Difficulties
- Negative Self Concept

Associated Harms of this Comorbidity ¹⁰⁻¹⁸

greater risk of suicide

pain interfering with life

increased rate of disability

increased pain and distress

worsening symptoms of PTSD

decreased patient satisfaction

negative impacts on social functioning

greater cost & increased health care utilization

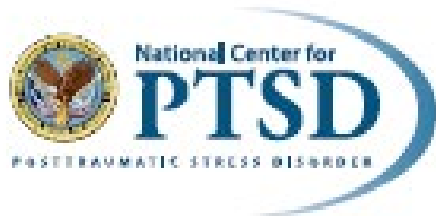
higher pain intensity, pain catastrophizing, disability, and health care utilization

poorer coping skills when both conditions are present vs. just one or the other

What We Resist, Persists

CONCEPTUAL MODELS

A solid orange horizontal bar at the bottom of the slide.



PTSD *Research Quarterly*

VOLUME 33/NO. 2 • ISSN: 1050-1835 • 2022

ADVANCING SCIENCE AND PROMOTING UNDERSTANDING OF TRAUMATIC STRESS

Published by:

National Center for PTSD
 VA Medical Center (116D)
 215 North Main Street
 White River Junction
 Vermont 05009-0001 USA

(802) 296-5132

FAX (802) 296-5135

Email: ncptsd@va.gov

All issues of the PTSD Research
 Quarterly are available online at:

Posttraumatic Stress Disorder and Chronic Pain

Jennifer L. Murphy, PhD

Pain Management, Opioid Safety, and Prescription Drug
 Monitoring Program

Mary A. Driscoll, PhD

PRIME Center of Excellence, VA Connecticut Healthcare System

Annie S. Odom, PhD

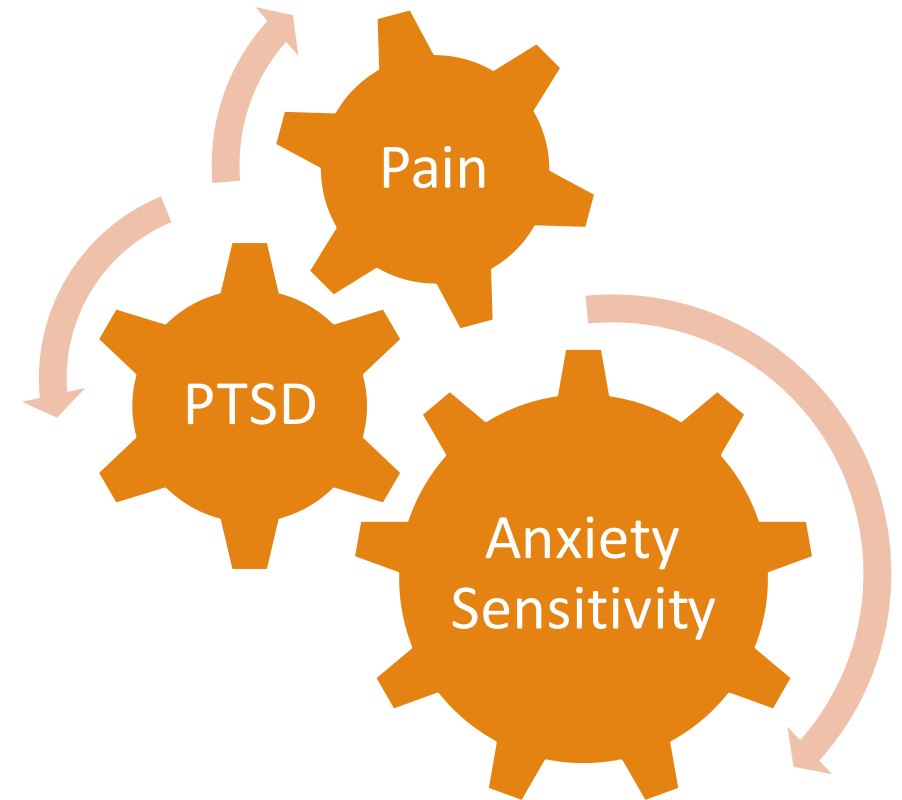
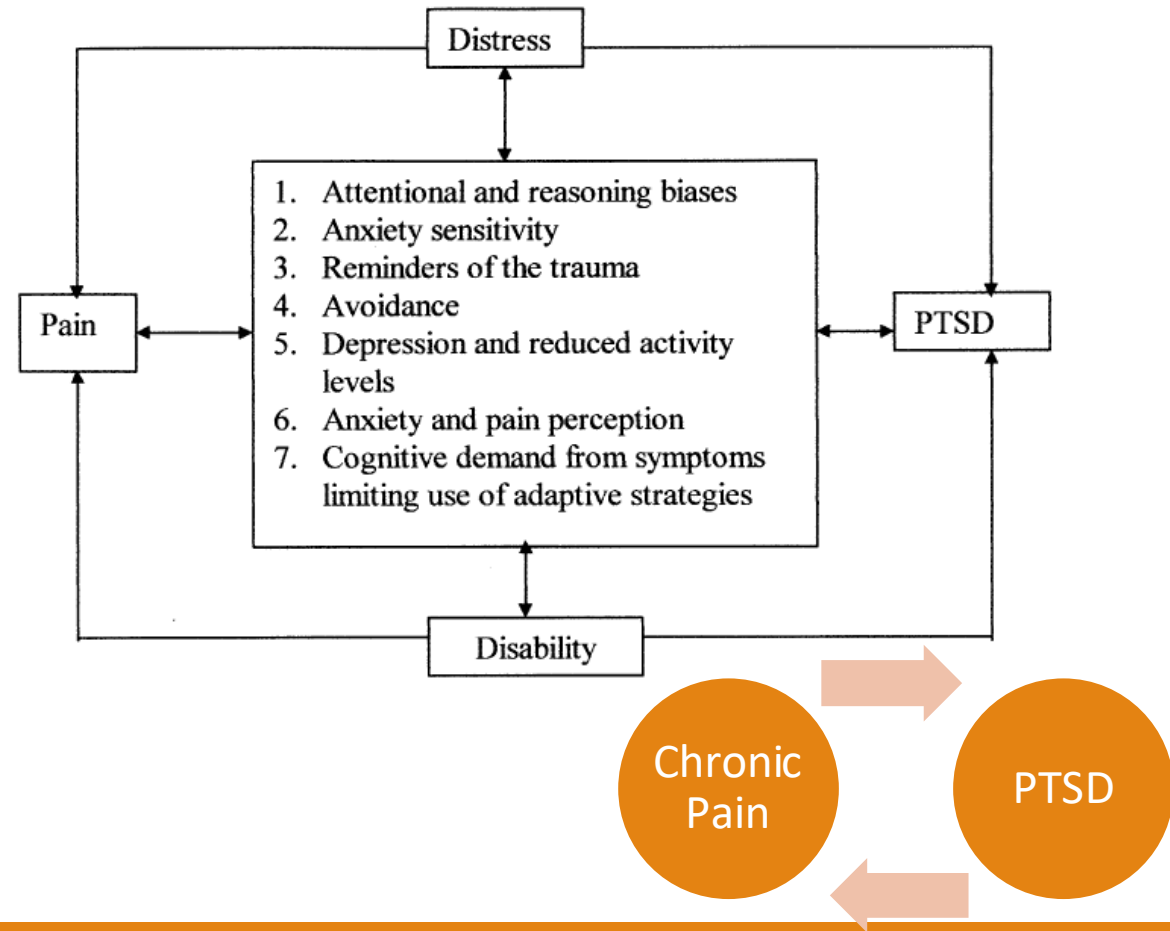
Center for Access and Delivery Research and Evaluation (CADRE)

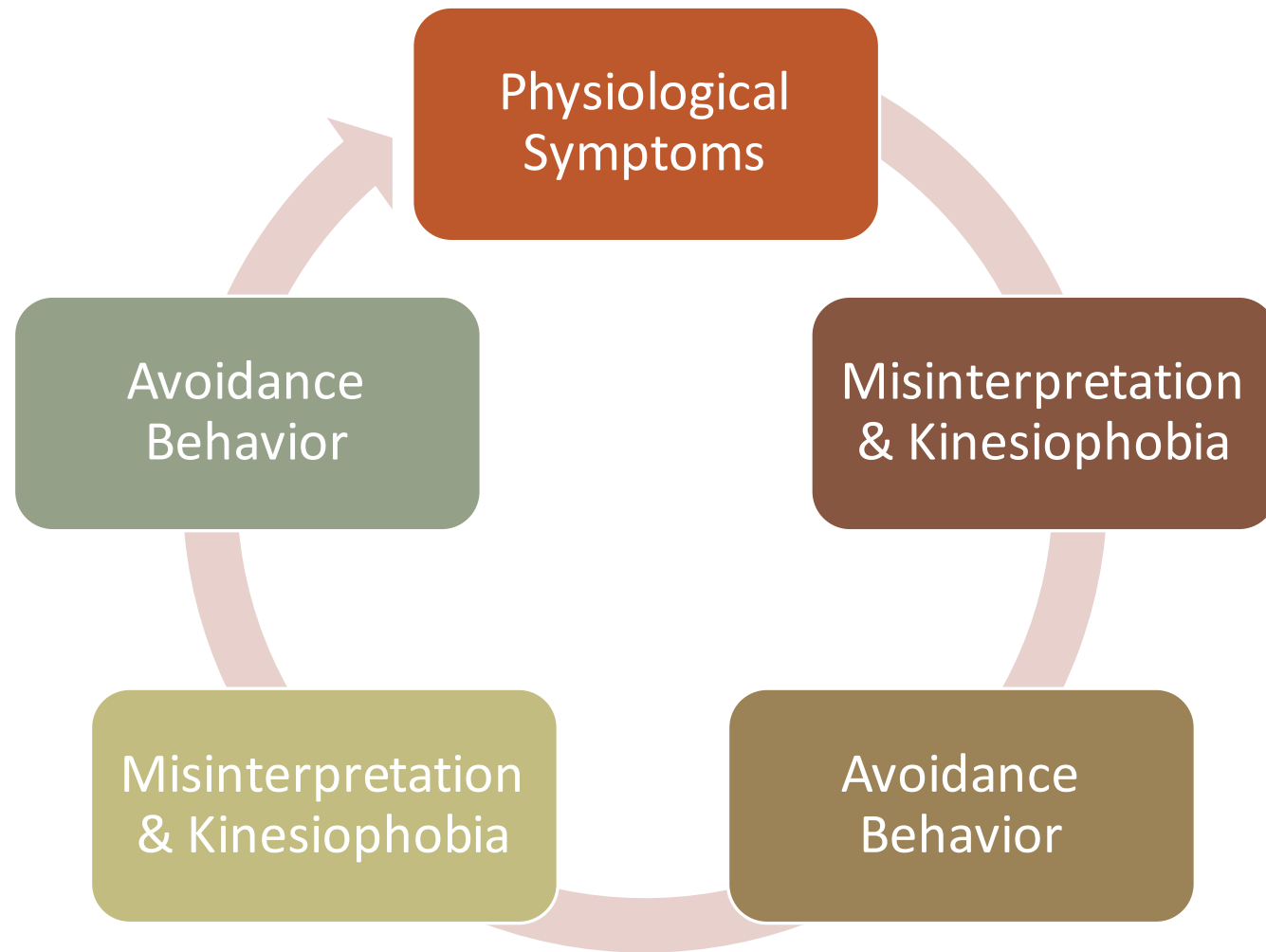
Katherine Hadlandsmyth, PhD

Center for Access and Delivery Research and Evaluation (CADRE)

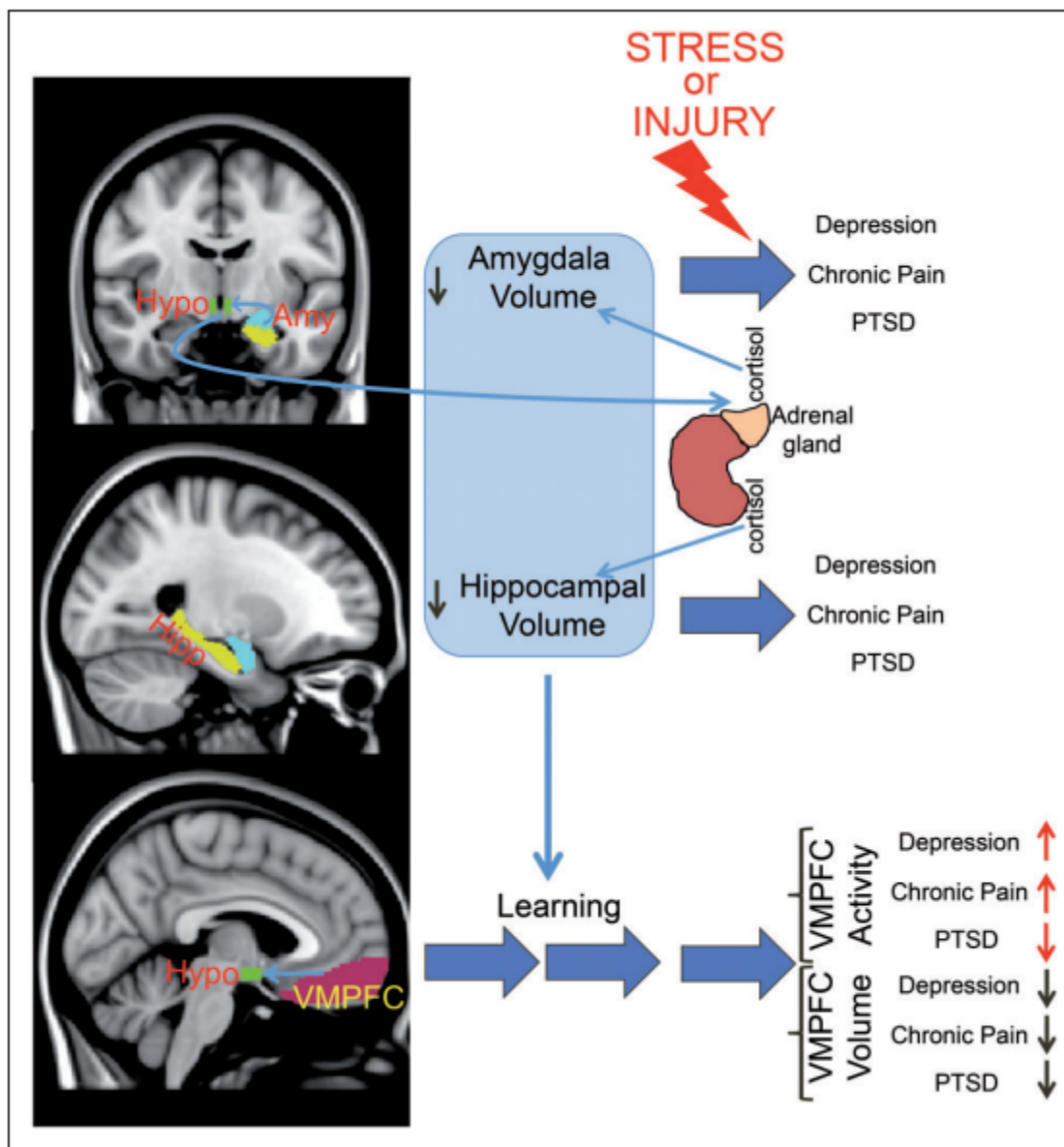
Mutual Maintenance

Shared Vulnerability





Fear-Avoidance Model



Invited Review—Inaugural Issue: RDoC & Beyond

CHRONIC STRESS

Chronic Stress
 Volume 1: 1–10
 © The Author(s) 2017
 DOI: 10.1177/2470547017704763
 journals.sagepub.com/home/css

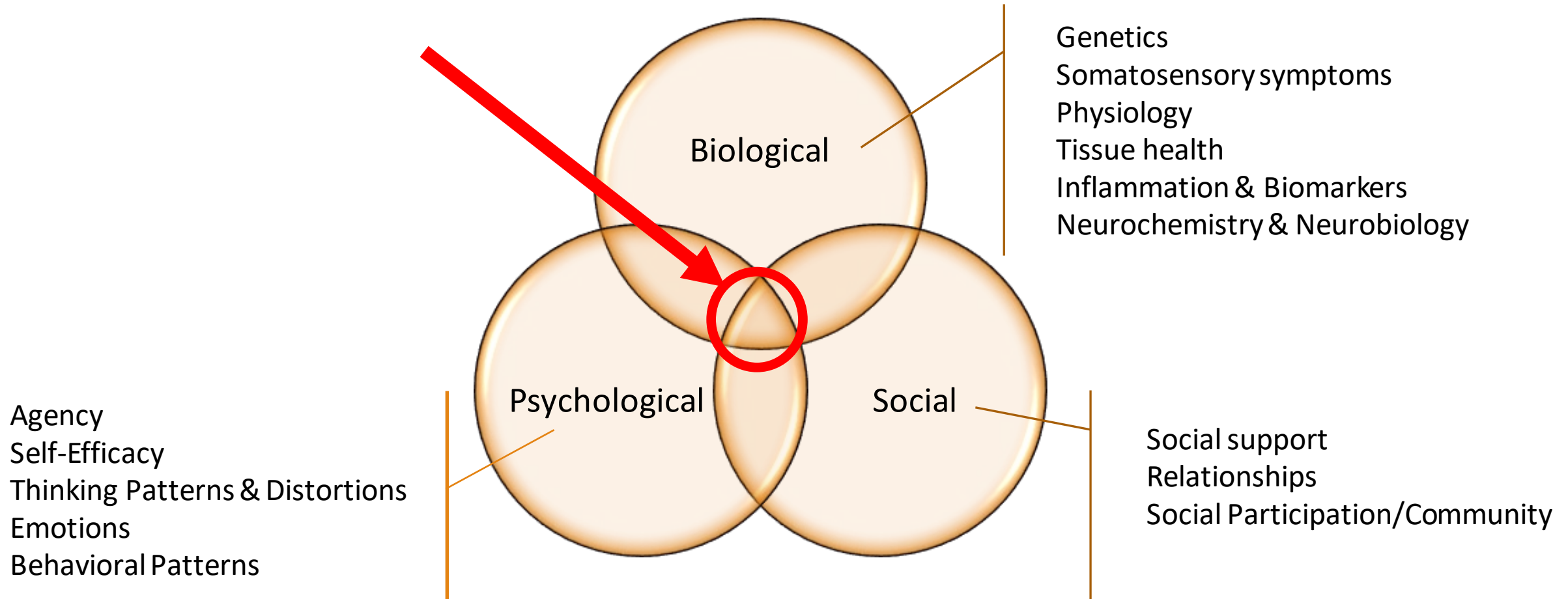


Chronic Pain and Chronic Stress: Two Sides of the Same Coin?

Chadi G Abdallah^{1,2} and Paul Geha^{1,2,3}



Biopsychosocial Model 20-23

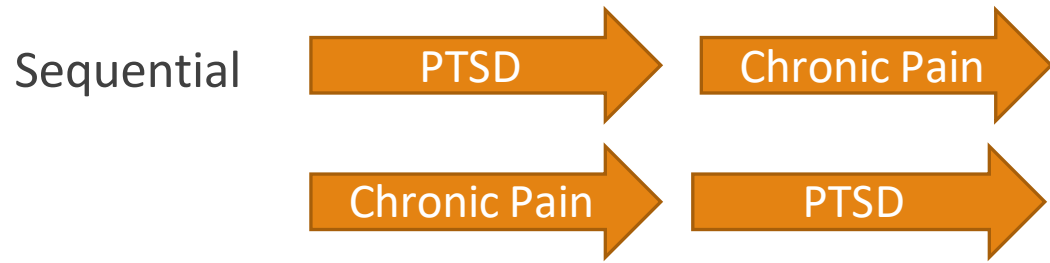


THE MISSING PIECE

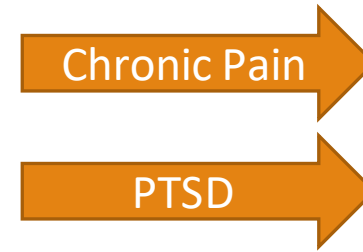


TREATMENT MODELS

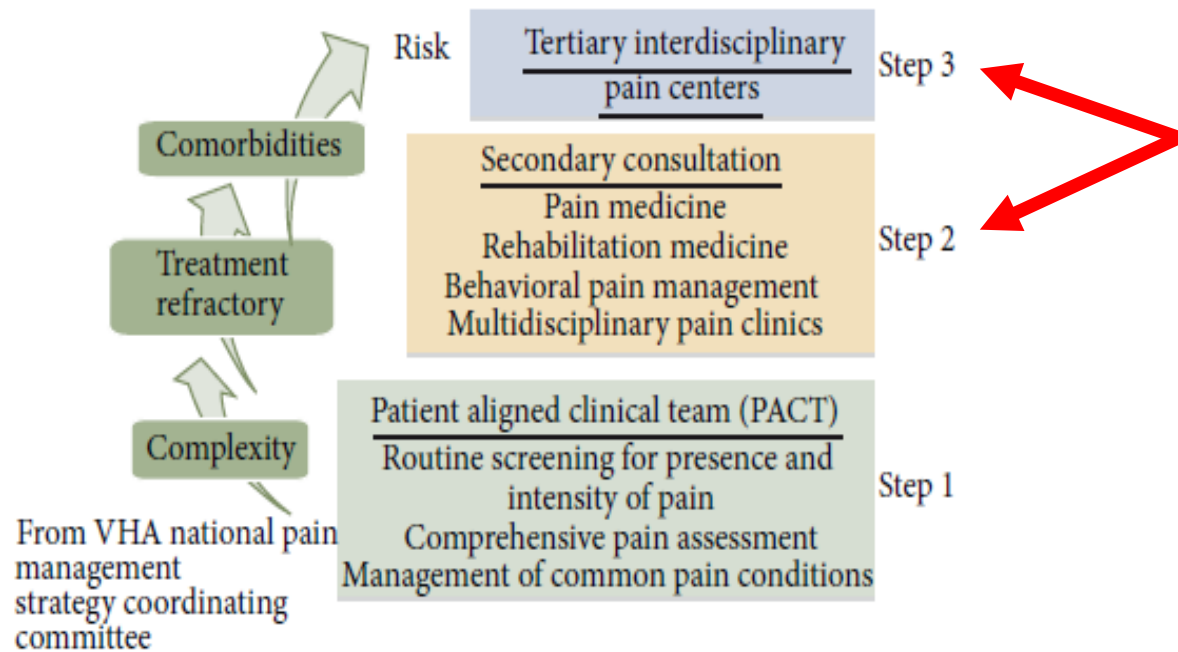
Treatment Models



Concurrent/Parallel



Integrated



Integrated, Non-Pharmacological Pilot Trials ³⁵⁻⁴⁰

Psychotherapy

- Cognitive & Behavioral Models
- Emotional Awareness Expression Therapy
- Exposure-based interventions
- Acceptance Based Therapies

- CPT + CBT-CP – Otis et al., 2009 (N=6)
- CPT + CBT-CP for Women with Fibromyalgia – Lacefield et al., 2020 (N=12)
- BA for CP-PTSD – Plagge et al., 2013 (N=58)
- Emotional Awareness Expression Therapy for CP-PTSD - Yarns et al., 2022 (N=16)

Complementary and Integrative Health

- Mindfulness
- Yoga
- Tai Chi

- Mindfulness for women with chronic pain– Okvat et al., 2021 (N=105)
- Yoga for CP-PTSD – Chopin et al., 2020 (N=49)





PTSD *Research Quarterly*

VOLUME 33/NO. 2 • ISSN: 1050-1835 • 2022

ADVANCING SCIENCE AND PROMOTING UNDERSTANDING OF TRAUMATIC STRESS

Published by:

National Center for PTSD
VA Medical Center (116D)
215 North Main Street
White River Junction
Vermont 05009-0001 USA

(802) 296-5132

FAX (802) 296-5135

Email: ncptsd@va.gov

All issues of the PTSD Research
Quarterly are available online at

Posttraumatic Stress Disorder and Chronic Pain

Jennifer L. Murphy, PhD

Pain Management, Opioid Safety, and Prescription Drug
Monitoring Program

Mary A. Driscoll, PhD

PRIME Center of Excellence, VA Connecticut Healthcare System

Annie S. Odom, PhD

Center for Access and Delivery Research and Evaluation (CADRE)

Katherine Hadlandsmyth, PhD

Center for Access and Delivery Research and Evaluation (CADRE)



Our Site

RESEARCH QUESTIONS

- What are stakeholder perspectives about the integrated care for pain and PTSD that is available at the Portland VA?
- What are the barriers? Facilitators?
- Opinions on CIH vs. traditional approaches?
- In person vs. virtual?

METHODS

Design: Qualitative study

Setting: Portland VAMC

Participants: multilevel stakeholders previously engaged with conventional and/or CIH care for chronic pain and/or PTSD

Procedures:

- Purposive sampling
- Qualitative Interviews - audio recorded & transcribed verbatim

Analytic Strategy: Thematic Analysis to identify and define themes



N=38
Admin = 2
Manager = 5
Providers = 10
Veterans = 18

Key Themes

Generally positive views of VA delivery of CIH care, modalities, uptake by the VA and a desire for more CIH

In-home modalities facilitate access to care

Important treatment components identified:

- Addressing comorbidity
- Pain Neuroscience
- Integrated multidisciplinary team
- Options for care – conventional and CIH
- Evidence based care

Lack of consistently available integrated interventions

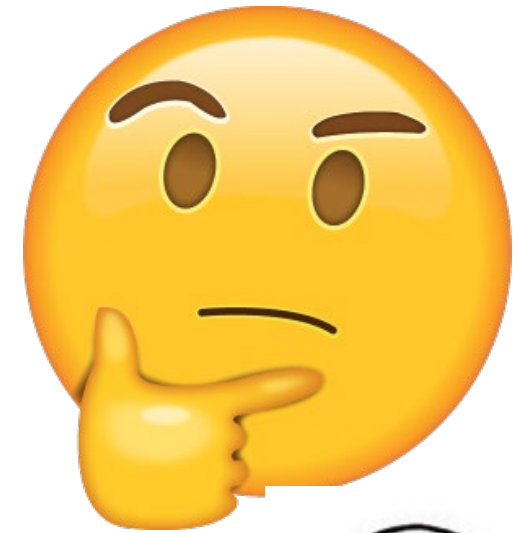
Lack of central location for current offerings

Barriers:

- Technology fluency
- Technology access
- Scheduling limitations
- Rurality and commuting

Facilitators

Barriers



“Hi,” it said.

“Hi,” said the piece.

“Are you anybody else’s missing piece?”

“Not that I know of.”

“Well, maybe you want to be your own piece?”

“I can be someone’s and still be my own.”

“Well, maybe you don’t want to be mine.”

“Maybe I do.”

“Maybe we won’t fit....”

“Well...”

The Case for Yoga



The Impact of Psychological Interventions on Posttraumatic Stress Disorder and Pain Symptoms

A Systematic Review and Meta-Analysis

Ellen Goldstein, PhD,* Christina McDonnell, MSc,†
 Rachel Atchley, PhD, MCR,‡ Kathleen Dorado, BA,† Carter Bedford, BA,‡
 Roger L. Brown, PhD,§ and Aleksandra E. Zgierska, MD, PhD*

- 2019
- N=18 (11 RCTs), 1583 participants
- 3 modalities: Exposure-based, CBT, Mindfulness
- RCTs, Uncontrolled, Multimodal

Outcome	Nonsignificant	Moderate	Large
PTSD		X	
Pain Intensity	X		
Pain interference	X		

Modality	PTSD	Pain Intensity
Exposure-based	LARGE	small
CBT	LARGE	small
Mindfulness	Medium	Medium



Eight Limbs of Yoga



1 yamas 5 social ethics

ahimsa - kindness
satya - truthfulness
asteya - nonstealing
brahmacharya - moderation
aparigraha - generosity

2 niyamas 5 personal practices

saucha - purity
santosha - contentment
tapas - austerity
swadyaya - self-study
iswara-pranidhana - surrender

8 samadhi pure bliss

Constant complete harmony
of the Self with universe

★ 3 asana postures

Easy comfortable positions
of the body, connecting
the mind and spirit to
experience stillness
and infinity

7 dhyana de-concentration

Dropping all the efforts and letting go

★ 4 pranayama mindful breathing

Honoring the breath to
uncover the light within

★ 6 dharana concentration

Focus and
attention

★ 5 pratyahara turning inward

Providing alternate 'inner point of attraction'
(like breath, chakra) to the senses to go inward

artofliving.org

What is Yoga?

Trauma Sensitive Yoga/ Trauma-
Informed Yoga

Breathing Stretching Relaxation

Exercise

Sudarshan Kriya Yoga (SKY)

Hatha

Nidre

Kundalini

Like a Hand in a Glove

SKILLS FOR MANAGING PAIN AND PTSD

Being aware of the body

Being aware of thoughts

Relaxation of the central nervous system

Breathing

Gentle movement

Reducing catastrophic thinking

YOGA PILLAR/CONCEPT

Interoception

Meditation/mindfulness

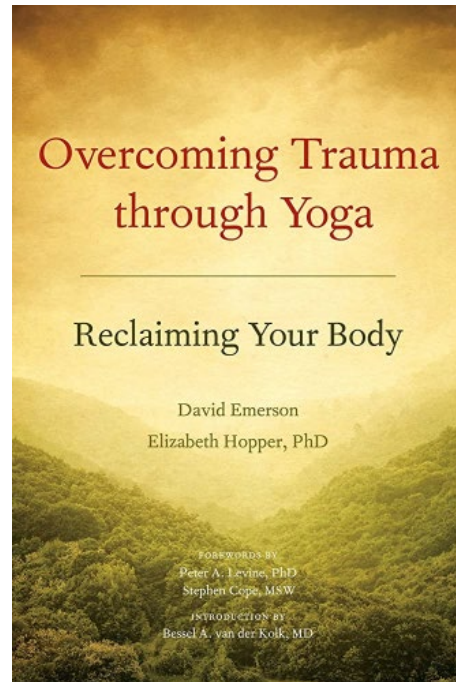
All pillars

Breathing

Postures

Concentration & 4 Noble Truths





Yoga for PTSD

Skills and Benefits

- Developing awareness of bodily sensations, cultivating nonreactivity to those sensations
- Relaxation training (breathing & meditation)
- Focus and attention training (cued awareness)

Protocols and programs

- Trauma Center Trauma Sensitive Yoga

Yoga for PTSD: The Evidence ⁴⁵⁻⁵³

- Pilot and single arm studies show promise and have examine feasibility, PTSD symptom reduction, cognitive benefits, etc.
- RCTs for Veterans with PTSD
 - Clinically significant change in CAPS-5 and PCL-5
 - Large effect sizes for **mindfulness, interoception, self-regulation**
 - Significant **decreases in re-experiencing symptoms and PTSD symptoms**
 - Expressive **suppression significantly decreased**
- Systematic reviews and evidence maps show this is being widely studied
- Meta-analysis: low evidence for effect on PTSD sx; inconclusive



Yoga for Chronic Pain



GENTLE MOVEMENT



PACING



ENHANCE THE
RELAXATION
RESPONSE



MANAGE THINKING



Skills and Benefits

- Developing awareness of bodily sensations, cultivating nonreactivity to those sensations
- Relaxation training
- Focus and attention training
- Low intensity movement with encouragement to work up to but not exceed comfort limit
- Meditation and breathing practice

Protocols and programs

- Mindful Movement for Chronic Pain
- Mindful Yoga

Yoga for Chronic Pain: The Evidence 54-63

Pilot and single arm studies

- Pain, depression, energy and HRQOL significantly more in women than men for CLBP

Pilot RCT

- Pain severity and interference (BPI) significantly improved compared to usual care
- Fibromyalgia symptoms and coping were significantly improved compared to WLC
- Yoga showed superior pain relief and functional improvements for chronic neck pain compared to self-care/exercise

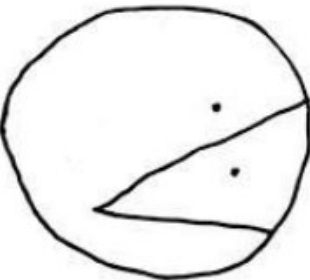
RCT

- Among Veterans with CLBP, disability reduced more at long-term follow up in yoga vs. delayed yoga
- In Veterans with GWI, fatigue reduced significantly more in yoga vs CBT (other outcomes did not differ)

SR & MA

- Among US military, CIH approaches significantly improved physical and pain intensity compared to controls
- 12 weeks of yoga can significantly reduce nonspecific LBP
- Strong evidence for short-term effects of yoga for pain, back-specific disability, and global improvement as well as long-term effect on pain. Moderate evidence for long-term effect on back-specific disability.

Qualitative Exploration





AMERICAN
PSYCHOLOGICAL
ASSOCIATION



DIVISION 56
TRAUMA PSYCHOLOGY
AMERICAN PSYCHOLOGICAL ASSOCIATION

Psychological Trauma:
Theory, Research, Practice, and Policy

In the public domain
ISSN: 1942-9681

2020, Vol. 12, No. 8, 888–896
<http://dx.doi.org/10.1037/tra0000649>

Yoga for Warriors: An Intervention for Veterans With Comorbid Chronic Pain and PTSD

Suzette M. Chopin

Central Virginia VA Medical Center, Richmond, Virginia

Christina M. Sheerin

Virginia Commonwealth University

Brian L. Meyer

Central Virginia VA Medical Center, Richmond, Virginia, and Virginia Commonwealth University

Original Article

Whole Health Use and Interest Across Veterans With Co-Occurring Chronic Pain and PTSD: An Examination of the 18 VA Medical Center Flagship Sites

Global Advances in Health and Medicine
Volume 11: 1–11

© The Author(s) 2022


Article reuse guidelines:

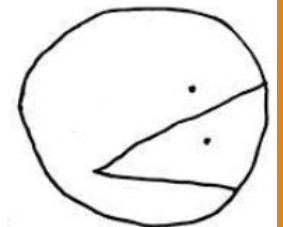
sagepub.com/journals-permissions

DOI: 10.1177/21649561211065374

journals.sagepub.com/home/gam



David E. Reed II^{1,2}, Barbara G. Bokhour^{3,4}, Lauren Gaj³, Anna M. Barker³, Jamie H. Douglas¹, Rian DeFaccio¹, Rhonda M. Williams^{1,5}, Charles C. Engel^{1,6}, and Steven B. Zeliadt^{1,2} 



Mindful Movement for Chronic Pain



Mindfulness Institute
VA Portland

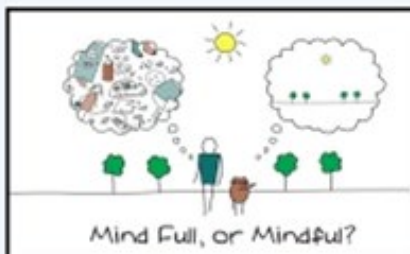


A Whole Health program to improve the health and well-being of Veterans and VA Staff through Mindfulness Training.

Mindful Movement for Chronic Pain (MM-CP) - Online Program

An 6-week program designed to improve chronic health conditions, stress and anxiety.

You will learn mindfulness meditation practices, gentle movement practices, and pain self-management skills.



Start Date

Sept 22, 2022

Attending Mindfulness Orientation prior to starting strongly encouraged

6 weekly classes

Thursdays, 1:00-2:30pm

Call (971 238 4313) to register for an Orientation for MM-CP



Future Directions

Integrate and update conceptual models

More consistent incorporation of biological outcomes

Dismantling studies to increase understanding of mechanisms of action

Create and trial standardized/manualized protocols to reduce intervention heterogeneity

Increase access to underrepresented and minority/marginalized populations:

- Widen representation of facilitators with regard to race/ethnicity, SOGI, ability status, age
- Virtual offerings for rural residing individuals
- Oversampling of minority/marginalized populations

Trial yoga protocols tailored for comorbid chronic pain and PTSD

Trial Implementation strategies

Engage Veterans in research process early and often

References

1. Kerns RD, Otis J, Rosenberg R, Reid MC. Veterans' reports of pain and associations with ratings of health, health-risk behaviors, affective distress, and use of the healthcare system. *J Rehabil Res Dev*. 2003;40(5):371-379. [10.1682/jrrd.2003.09.0371](https://doi.org/10.1682/jrrd.2003.09.0371)
2. Schug SA, Lavand'homme P, Barke A, Korwisi B, Rief W, Treede R-D. The IASP classification of chronic pain for ICD-11: chronic postsurgical or posttraumatic pain. *Pain*. 2019; 160(1):45-52. [10.1097/j.pain.0000000000001413](https://doi.org/10.1097/j.pain.0000000000001413)
3. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL: Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med* 2004; 351(1): 13–22.
4. Thompson WW, Gottesman II, Zalewski C: Reconciling disparate prevalence rates of PTSD in large samples of US male Vietnam veterans and their controls. *BMC Psychiatry* 2006; 6(1): 1–10.
5. Andersen TE, Andersen PG, Vakkala MA, Elklit A. The traumatised chronic pain patient—prevalence of posttraumatic stress disorder—PTSD and pain sensitization in two Scandinavian samples referred for pain rehabilitation. *Scand J Pain*. 2012; 3(1): 39–43.
6. Alschuler KN, Otis JD. Coping strategies and beliefs about pain in veterans with comorbid chronic pain and significant levels of posttraumatic stress disorder symptoms. *Eur J Pain*. 2012; 16(2): 312-319. doi:10.1016/j.ejpain.2011.06.010
7. Shipherd JC, Keyes M, Jovanovic T, et al. Veterans seeking treatment for posttraumatic stress disorder: what about comorbid chronic pain?. *J Rehabil Res Dev*. 2007; 44(2): 153-166. doi:10.1682/jrrd.2006.06.0065
8. Kosek E, Cohen M, Baron R, et al. Do we need a third mechanistic descriptor for chronic pain states?. *Pain*. 2016;157(7):1382-1386. doi:10.1097/j.pain.0000000000000507
9. Fitzcharles MA, Cohen SP, Clauw DJ, Littlejohn G, Usui C, Häuser W. Nociceptive pain: towards an understanding of prevalent pain conditions. *Lancet*. 2021;397(10289):2098-2110. doi:10.1016/S0140-6736(21)00392-5
10. Geisser ME, Haig AJ, Theisen ME. Activity avoidance and function in persons with chronic back pain. *J Occup Rehabil*. 2000;10(3): 215–227. <https://doi.org/10.1023/A:1026666403039>
11. Turk DC, Okifuji A. Perception of traumatic onset, compensation status, and physical findings: impact on pain severity, emotional distress, and disability in chronic pain patients. *J Behav Med*. 1996;19(5):435-453. doi:10.1007/BF01857677
12. Shapiro MO, Short NA, Raines AM, Franklin CL, True G, Constans JI. Pain and posttraumatic stress: Associations among women veterans with a history of military sexual trauma [published online ahead of print, 2022 May 12]. *Psychol Trauma*. 2022;10.1037/tra0001272. doi:10.1037/tra0001272
13. Hinkel HM, Currier JM, Isaak SL, McAdams E, Kilpatrick JF. Moral injury and chronic pain among military veterans in an integrated behavioral health clinic [published online ahead of print, 2022 Mar]. *Psychol Trauma*. 2022;10.1037/tra0001230. doi:10.1037/tra0001230
14. Sherman JJ, Turk DC, Okifuji A. Prevalence and impact of posttraumatic stress disorder-like symptoms on patients with fibromyalgia syndrome. *Clin J Pain*. 2000;16(2):127–134. doi: [10.1097/00002508-200006000-00006](https://doi.org/10.1097/00002508-200006000-00006)
15. Outcalt SD, Yu Z, Hoen HM, Pennington TM, Krebs EE. Health care utilization among veterans with pain and posttraumatic stress symptoms. *Pain Med*. 2014;15(11):1872-1879. doi:10.1111/pme.12045
16. Shor R, Borowski A, Zekowitz RL, Pineles SL, Copeland LA, Finley EP, Perkins DF, Vogt D. The transition to civilian life: Impact of comorbid PTSD, chronic pain, and sleep disturbance on veterans' social functioning and suicidal ideation. *Psychol Trauma*. Advance online publication. <http://dx.doi.org/10.1037/tra0001271>
17. Benedict TM, Keenan PG, Nitz AJ, Moeller-Bertram T. Post-Traumatic stress disorder symptoms contribute to worse pain and health outcomes in veterans With PTSD compared to those without: A systematic review with meta-analysis. *Mil Med*. 2020;185(9-10):e1481-e1491. doi:10.1093/milmed/usaa052
18. Alschuler KN, Otis JD. Coping strategies and beliefs about pain in veterans with comorbid chronic pain and significant levels of posttraumatic stress disorder symptoms. *Eur J Pain*. 2012; 16(2): 312-319. doi:10.1016/j.ejpain.2011.06.010
19. Murphy JL, Driscoll, MA, Odom, AS, Hadlandsmyth, K (2022). Posttraumatic Stress Disorder and Chronic Pain. *PTSD Research Quarterly*, 33(2).
20. Skelly AC, Chou R, Dettori JR, et al. Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review. Rockland, MD: AHRQ, 2018.
21. Institute of Medicine. *Relieving Pain in America*. Washington, DC: IOM, 2011.
22. National Pain Strategy Task Force. *National Pain Strategy: A Comprehensive Population Health-Level Strategy for Pain*. Bethesda, MD: National Institutes of Health, 2015.
23. Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive treatments for acute, subacute, and chronic low back pain: A clinical practice guideline from the American College of Physicians. *Ann Intern Med* 2017;166:514–530

24. Asmundson, GJG, Coons, MJ, Taylor, S, & Katz, J. "PTSD and the experience of pain: research and clinical implications of shared vulnerability and mutual maintenance models," *Canadian Journal of Psychiatry*, vol. 47, no. 10, pp. 930–937, 2002.
25. Taylor S, Koch WJ, McNally RJ. How does anxiety sensitivity vary across the anxiety disorders? *J Anxiety Disord* 1992;6:249–59.
26. Taylor S. Anxiety sensitivity and its implications for understanding and treating PTSD. *Journal of Cognitive Psychotherapy*. Forthcoming.
27. Kuch K, Cox BJ, Evans R, Shulman I. Phobias, panic, and pain in 55 survivors of road vehicle accidents. *J Anxiety Disord* 1994;8:181–7
28. Asmundson GJG, Norton RG. Anxiety sensitivity in patients with physically unexplained chronic back pain: a preliminary report. *Behav Res Ther* 1995;33:771–7
29. Plehn K, Peterson RA, Williams DA. Anxiety sensitivity: its relationship to functional status in patients with chronic pain. *Journal of Occupational Rehabilitation* 1998;8:213–22.
30. E. B. Foa and M. J. Kozak, "Treatment of anxiety disorders: implications for psychopathology," in *Anxiety and the Anxiety Disorders*, Erlbaum Publishing, Hillsdale, NJ, USA, 1985.
32. E. B. Foa and M. J. 33. 33. Kozak, "Emotional processing of fear. Exposure to corrective information," *Psychological Bulletin*, vol. 99, no. 1, pp. 20–35, 1986.
33. Vlaeyen, J. W. S., & Linton, S. J. (2000). Fear-avoidance and its consequences in musculoskeletal pain: A state of the art. *Pain*, 85, 317–332.
34. P. J. Norton and G. J. G. Asmundson, "The fear-avoidance model of chronic musculoskeletal pain," *Physiotherapy Pain Association News*, vol. 16, pp. 18–20, 2003
35. Abdallah, C. G., & Geha, P. (2017). Chronic Pain and Chronic Stress: Two Sides of the Same Coin?. *Chronic stress (Thousand Oaks, Calif.)*, 1, 2470547017704763. <https://doi.org/10.1177/2470547017704763>
36. Scioli-Salter, E. R., Forman, D. E., Otis, J. D., Gregor, K., Valovski, I., & Rasmusson, A. M. (2015). The shared neuroanatomy and neurobiology of comorbid chronic pain and PTSD: Therapeutic implications. *The Clinical Journal of Pain*, 31(4), 363–374. <https://doi.org/10.1097/AJP.0000000000000115>
37. Otis, J. D., Keane, T. M., Kerns, R. D., Monson, C., & Scioli, E. (2009). The development of an integrated treatment for veterans with comorbid chronic pain and posttraumatic stress disorder. *Pain Medicine*, 10(7), 1300–1311. <https://doi-org.va.proxy.liblynxgateway.com/10.1111/j.1526-4637.2009.00715.x>
38. Lacefield, K., Samph, S. P., Orbon, S., & Otis, J. (2020). Integrated intervention for comorbid posttraumatic stress disorder and fibromyalgia: A pilot study of women veterans. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(7), 725–729. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/tra0000635.supp> (Supplemental)
39. Plagge, J. M., Lu, M. W., Lovejoy, T. I., Karl, A. I., & Dobscha, S. K. (2013). Treatment of comorbid pain and PTSD in returning veterans: A collaborative approach utilizing behavioral activation. *Pain Medicine*, 14(8), 1164–1172. <https://doi-org.va.proxy.liblynxgateway.com/10.1111/pme.12155>
40. Yarns, B. C., Molaie, A. M., Lumley, M. A., Zhu, T. A., Jazi, A. N., Ganz, D. A., & Melrose, R. J. (2022). Video telehealth emotional awareness and expression therapy for older uS Military veterans with chronic pain: A pilot study. *Clinical Gerontologist: The Journal of Aging and Mental Health*. <https://doi-org.va.proxy.liblynxgateway.com/10.1080/07317115.2022.2159909>
41. Okvat, H. A., Davis, M. C., Mistretta, E. G., & Mardian, A. S. (2022). Mindfulness-based training for women veterans with chronic pain: A retrospective study. *Psychological Services*, 19(Suppl 1), 106–119. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/ser0000599.supp> (Supplemental)
42. Chopin, S. M., Sheerin, C. M., & Meyer, B. L. (2020). Yoga for warriors: An intervention for veterans with comorbid chronic pain and PTSD. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(8), 888–896. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/tra0000649.supp> (Supplemental)
43. Goldstein, E., McDonnell, C., Atchley, R., Dorado, K., Bedford, C., Brown, R. L., & Zgierska, A. E. (2019). The Impact of Psychological Interventions on Posttraumatic Stress Disorder and Pain Symptoms: A Systematic Review and Meta-Analysis. *The Clinical journal of pain*, 35(8), 703–712. <https://doi.org/10.1097/AJP.0000000000000730>
44. Sullivan, M., Lopez, S., Nault, D., Moonaz, S., & Miller, R. (2021). Yoga meditation for active duty military members with post-traumatic stress disorder: Results and discussion of a landmark initial study. *The Journal of Alternative and Complementary Medicine*, 27(6), 522–524. <https://doi-org.va.proxy.liblynxgateway.com/10.1089/acm.2020.0466>
45. Kelly, U., Haywood, T., Segell, E., & Higgins, M. (2021). Trauma-Sensitive Yoga for post-traumatic stress disorder in women veterans who experienced military sexual trauma: Interim results from a randomized controlled trial. *The Journal of Alternative and Complementary Medicine*, 27(Suppl 1), S45–S59. <https://doi-org.va.proxy.liblynxgateway.com/10.1089/acm.2020.0417>

46. Davis, L. W., Schmid, A. A., Daggy, J. K., Yang, Z., O'Connor, C. E., Schalk, N., Do, A.-N. L., Maric, D., Lazarick, D., & Knock, H. (2020). Symptoms improve after a yoga program designed for PTSD in a randomized controlled trial with veterans and civilians. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(8), 904–912. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/tra0000564.supp> (Supplemental)
47. Mehling, W. E., Chesney, M. A., Metzler, T. J., Goldstein, L. A., Maguen, S., Geronimo, C., Agcaoili, G., Barnes, D. E., Hlavin, J. A., & Neylan, T. C. (2018). A 12-week integrative exercise program improves self-reported mindfulness and interoceptive awareness in war veterans with posttraumatic stress symptoms. *Journal of Clinical Psychology*, 74(4), 554–565. <https://doi-org.va.proxy.liblynxgateway.com/10.1002/jclp.22549>
48. Dick, A. M., Niles, B. L., Street, A. E., DiMartino, D. M., & Mitchell, K. S. (2014). Examining mechanisms of change in a yoga intervention for women: The influence of mindfulness, psychological flexibility, and emotion regulation on PTSD symptoms. *Journal of Clinical Psychology*, 70(12), 1170–1182. <https://doi-org.va.proxy.liblynxgateway.com/10.1002/jclp.22104>
49. O'Shea, M., Capon, H., Evans, S., Agrawal, J., Melvin, G., O'Brien, J., & Mclver, S. (2022). Integration of hatha yoga and evidence-based psychological treatments for common mental disorders: An evidence map. *Journal of Clinical Psychology*, 78(9), 1671–1711. <https://doi-org.va.proxy.liblynxgateway.com/10.1002/jclp.23338>
50. Cushing, R. E., & Braun, K. L. (2018). Mind–body therapy for military veterans with post-traumatic stress disorder: A systematic review. *The Journal of Alternative and Complementary Medicine*, 24(2), 106–114. <https://doi-org.va.proxy.liblynxgateway.com/10.1089/acm.2017.0176>
51. Duan-Porter et al. Page 7 J Phys Act Health. Author manuscript; available in PMC 2017 June 05. VA Author Manuscript VA Author Manuscript VA Author Manuscript of yoga for PTSD
52. Nguyen-Feng, V. N., Clark, C. J., & Butler, M. E. (2019). Yoga as an intervention for psychological symptoms following trauma: A systematic review and quantitative synthesis. *Psychological Services*, 16(3), 513–523. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/ser0000191>
53. Cramer, H., Anheyer, D., Saha, F. J., & Dobos, G. (2018). Yoga for posttraumatic stress disorder - a systematic review and meta-analysis. *BMC psychiatry*, 18(1), 72. <https://doi.org/10.1186/s12888-018-1650-x>
54. Groessl, E. J., Weingart, K. R., Johnson, N., & Baxi, S. (2012). The benefits of yoga for women veterans with chronic low back pain. *The Journal of Alternative and Complementary Medicine*, 18(9), 832–838. <https://doi-org.va.proxy.liblynxgateway.com/10.1089/acm.2010.0657>
55. Schmid, A. A., Fruhauf, C. A., Sharp, J. L., Van Puymbroeck, M., Bair, M. J., & Portz, J. D. (2019). Yoga for people with chronic pain in a community-based setting: A feasibility and pilot RCT. *Journal of Evidence-Based Integrative Medicine*, 24. <https://doi-org.va.proxy.liblynxgateway.com/10.1177/2515690X19863763>
56. Carson, J. W., Carson, K. M., Jones, K. D., Bennett, R. M., Wright, C. L., & Mist, S. D. (2010). A pilot randomized controlled trial of the Yoga of Awareness program in the management of fibromyalgia. *Pain*, 151(2), 530–539. <https://doi-org.va.proxy.liblynxgateway.com/10.1016/j.pain.2010.08.020>
57. Michalsen, A., Traitteur, H., Lüdtke, R., Brunnhuber, S., Meier, L., Jeitler, M., Büssing, A., & Kessler, C. (2012). Yoga for chronic neck pain: A pilot randomized controlled clinical trial. *The Journal of Pain*, 13(11), 1122–1130. <https://doi-org.va.proxy.liblynxgateway.com/10.1016/j.jpain.2012.08.004>
58. Groessl, E. J., Liu, L., Chang, D. G., Wetherell, J. L., Bormann, J. E., Atkinson, J. H., Baxi, S., & Schmalzl, L. (2017). Yoga for military veterans with chronic low back pain: A randomized clinical trial. *American Journal of Preventive Medicine*, 53(5), 599–608. <https://doi-org.va.proxy.liblynxgateway.com/10.1016/j.amepre.2017.05.019>
59. Bayley, P. J., Schulz-Heik, R. J., Cho, R., Mathersul, D., Collery, L., Shankar, K., Ashford, J. W., Jennings, J. S., Tang, J., Wong, M. S., Avery, T. J., Stanton, M. V., Meyer, H., Friedman, M., Kim, S., Jo, B., Younger, J., Mathews, B., Majmundar, M., & Mahoney, L. (2021). Yoga is effective in treating symptoms of Gulf War illness: A randomized clinical trial. *Journal of Psychiatric Research*, 143, 563–571. <https://doi-org.va.proxy.liblynxgateway.com/10.1016/j.jpsychires.2020.11.024>
60. Donahue, M. L., Dunne, E. M., Gathright, E. C., DeCosta, J., Balletto, B. L., Jamison, R. N., Carey, M. P., & Scott-Sheldon, L. A. J. (2021). Complementary and integrative health approaches to manage chronic pain in US military populations: Results from a systematic review and meta-analysis, 1985–2019. *Psychological Services*, 18(3), 295–309. <https://doi-org.va.proxy.liblynxgateway.com/10.1037/ser0000417.supp> (Supplemental)
61. Kim, S.-D. (2020). Twelve weeks of yoga for chronic nonspecific lower back pain: A meta-analysis. *Pain Management Nursing*, 21(6), 536–542. <https://doi-org.va.proxy.liblynxgateway.com/10.1016/j.pmn.2020.07.002>

62. Cramer, H., Lauche, R., Haller, H., & Dobos, G. (2013). A systematic review and meta-analysis of yoga for low back pain. *The Clinical journal of pain, 29*(5), 450–460. <https://doi.org/10.1097/AJP.0b013e31825e1492>
63. Tul, Y., Unruh, A., & Dick, B. D. (2011). Yoga for chronic pain management: A qualitative exploration. *Scandinavian Journal of Caring Sciences, 25*(3), 435–443. <https://doi-org.va.proxy.liblynxgateway.com/10.1111/j.1471-6712.2010.00842.x>
64. Reed, D. E., 2nd, Bokhour, B. G., Gaj, L., Barker, A. M., Douglas, J. H., DeFaccio, R., Williams, R. M., Engel, C. C., & Zeliadt, S. B. (2022). Whole Health Use and Interest Across Veterans With Co-Occurring Chronic Pain and PTSD: An Examination of the 18 VA Medical Center Flagship Sites. *Global advances in health and medicine, 11*, 21649561211065374. <https://doi.org/10.1177/21649561211065374>

Namaste!

Belle.zaccari@va.gov

