UW PACC
Psychiatry and Addictions Case Conference
UW Medicine | Psychiatry and Behavioral Sciences

UPDATES TO PTSD PSYCHOPHARMACOLOGY TREATMENT

ANNA SEARS, DNP, ARNP, PMHNP-BC

MADELINE PHIPPS, MSN, PMHNP-BC

UW ADVANCED PRACTICE PSYCHIATRIC PROVIDER FELLOWS

UW Medicine
UW SCHOOL OF MEDICINE

Integrated Care Training Program
UW Psychiatry & Behavioral Sciences

project ECHO

SPEAKER DISCLOSURES

- ✓ Any conflicts of interest?
  - None

PLANNER DISCLOSURES

The following series planners have no relevant conflicts of interest to disclose; other disclosures have been mitigated.

Mark Duncan MD
Rick Ries MD
Kari Stephens PhD
Barb McCann PhD
Anna Ratzliff MD PhD
Betsy Payn MA PMP
Esther Solano
Cara Towle MSN RN

UW PACC

OBJECTIVES

1. Describe first-line pharmacotherapy treatments for PTSD.
2. Understand evidence base for augmentation options for PTSD treatment
3. Apply appropriate decision-making to variety of clinical scenarios
4. Articulate the evidence base for emerging PTSD treatments

CASE STUDY

- Ms. J is a 43-year-old female presenting after referral from her PCP. Experienced a car accident in 2023 where her and her husband had to be hospitalized for months due to severe injuries.
- **Mood/Anxiety:** Has felt little enjoyment in hobbies for the past 2 years. Attributes to questioning what she could have done to prevent car accident. Sleeps poorly due to nightmares about nearly dying, being trapped. Often avoids driving (when she does, experiences increased HR, SOB, dizziness), has led to her working part time as public transportation to work takes 3 hours out of her day. Has been going on since she discharged from the hospital in 2023.
  - Denies SI; no history of suicidal thoughts/attempts
- **Psychosis**: Reports at times feeling like she can hear brakes screeching when riding in a car, reminds her of the accident. Otherwise denies AVH, paranoia.
- **Substance Use**: 2 glasses of wine per week, otherwise denies
- **Recent stressors**: Has had to work part-time, has led to financial stress in the family, though able to make ends meet.
- **Psychiatric History**: None
- **No known family history of psychiatric or substance use issues**
- **No previous medications trials**

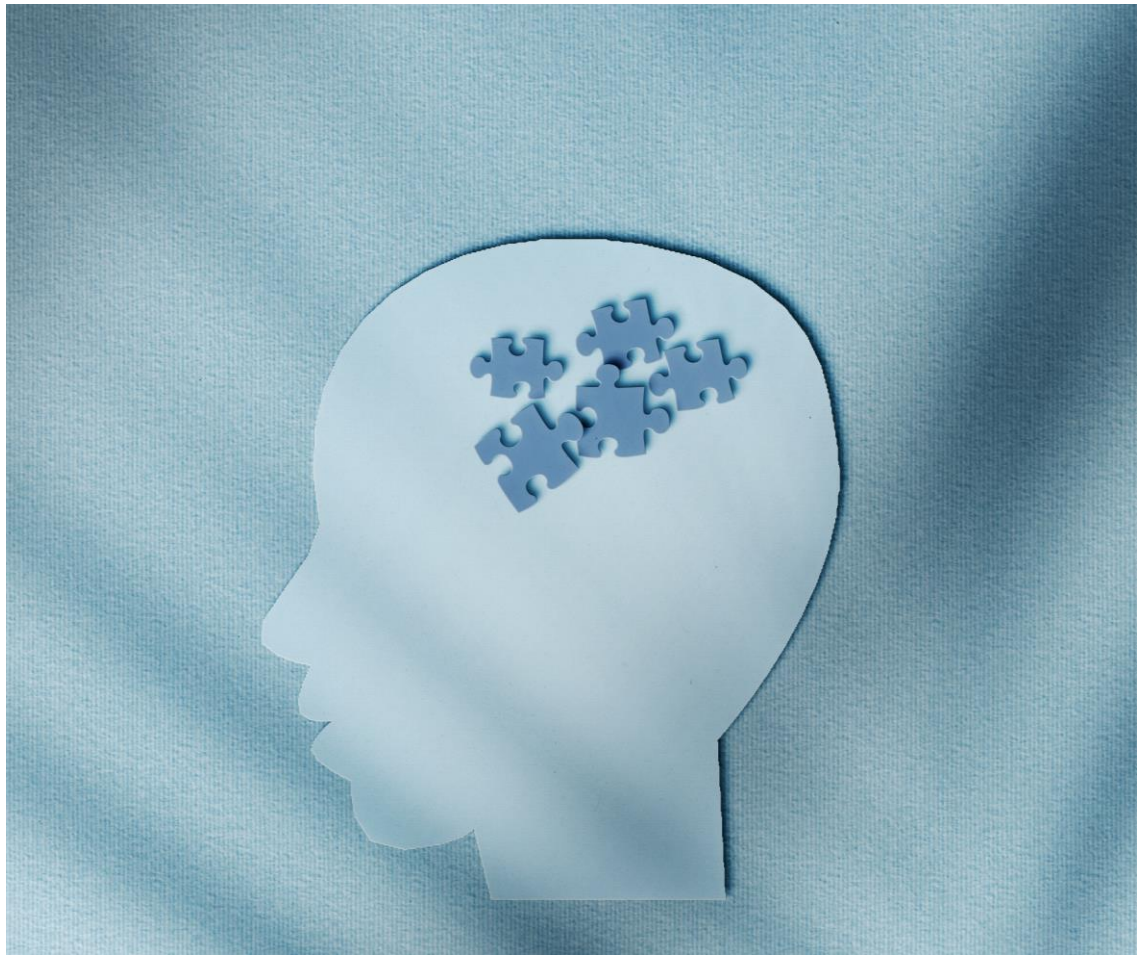
WHAT DO YOU THINK IS GOING ON?

UW PACC

DSM-V-TR DIAGNOSIS FOR PTSD

- Exposure to actual or threatened death, serious injury, or sexual violence
- Presence of one or more intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred
- Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred
- Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two or more symptoms
- Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) symptoms
- Duration of the disturbance is more than 1 month.
- The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.
- Specify whether: with dissociative symptoms, depersonalization, derealization
- Specify whether: With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate).

STRONGEST EVIDENCE FOR PSYCHOTHERAPY > PHARMACOTHERAPY



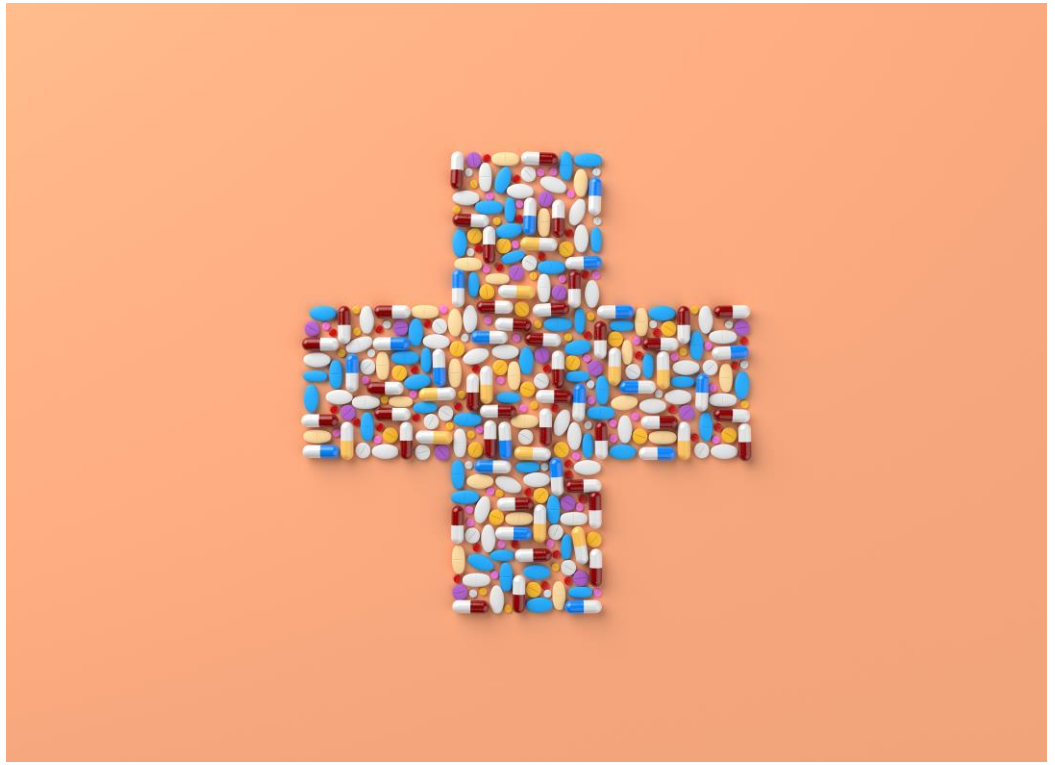
- Evidence-base is strongest for exposure therapies
  - Cognitive Processing Therapy (CPT)
  - Eye Movement Desensitization and Reprocessing (EMDR)
  - Prolonged Exposure Therapy

UW PACC

Topic	Sub-topic	#	Recommendation	Strength[a]	Category[b]
cont.)	*Pharmacotherapy*	15.	We recommend paroxetine, sertraline, or venlafaxine for the treatment of PTSD.	Strong for	Reviewed, New-replaced
		16.	There is insufficient evidence to recommend for or against amitriptyline, bupropion, buspirone, citalopram, desvenlafaxine, duloxetine, escitalopram, eszopiclone, fluoxetine, imipramine, mirtazapine, lamotrigine, nefazodone, olanzapine, phenelzine, pregabalin, rivastigmine, topiramate, or quetiapine for the treatment of PTSD.	Neither for nor against	Reviewed, New-replaced
	Pharmacotherapy (cont.)	17.	There is insufficient evidence to recommend for or against psilocybin, ayahuasca, dimethyltryptamine, ibogaine, or lysergic acid diethylamide for the treatment of PTSD.	Neither for nor against	Reviewed, New-added
		18.	We suggest against divalproex, guanfacine, ketamine, prazosin, risperidone, tiagabine, or vortioxetine for the treatment of PTSD.	Weak against	Reviewed, New-replaced
		19.	We recommend against benzodiazepines for the treatment of PTSD.	Strong against	Reviewed, New-replaced
		20.	We recommend against cannabis or cannabis derivatives for	Strong	Reviewed,

PHARMACOTHERAPY

- FDA approved for PTSD
  - Sertraline
  - Paroxetine
- Off-label
    - Mirtazapine
    - Amitriptyline
    - Venlafaxine



What would be your recommendations for Ms. J?

UW PACC

CASE STUDY- CONTINUED

Ms. J returns to your clinic 6 months after completing a course of Cognitive Processing Therapy. She has now been on sertraline 200 mg daily for 8 months. She still struggles with the following symptoms:

- Nightmares
- Little enjoyment of hobbies
- Is still avoiding driving
- Believes that she could've prevented the car accident from happening

What adjunctive medications could you consider?

UW PACC

PROPRANOLOL

Limited evidence for efficacy in hyperarousal, intrusive symptoms

Combined use with therapy

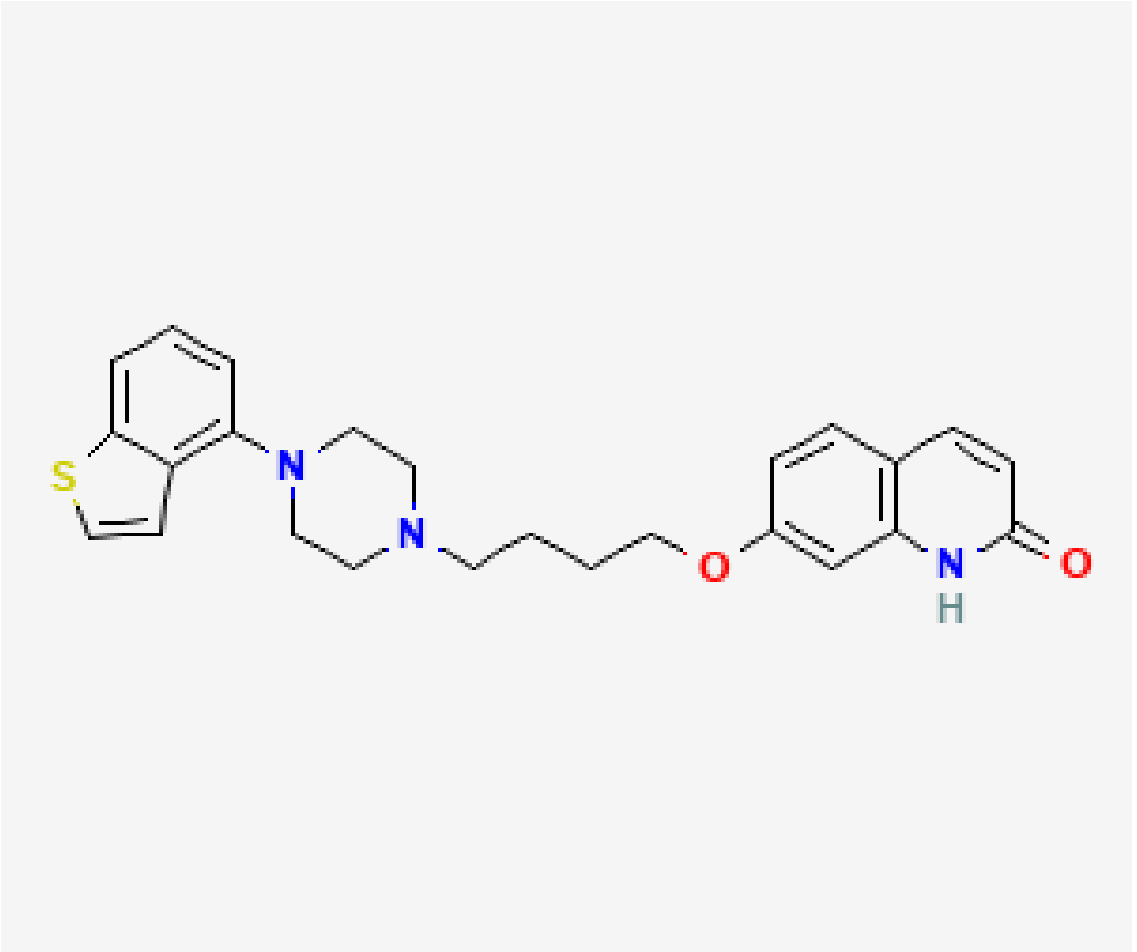
Memory reconsolidation via exposure therapy + medication 60 minutes prior

- May decrease nightmare severity

UW PACC

ANTIPSYCHOTICS

- Brexipiprazole approved for use with sertraline
    - Dosage: 1-3 mg added to sertraline
    - Re-experiencing, avoidance, negative cognition, depression, hyperarousal, and reactivity
- Risperidone, quetiapine, and other SGAs
  - Mixed evidence, weak to no support
  - May specifically help with intrusion and hyperarousal symptoms



PRAZOSIN

- Mixed evidence
  - 15-week positive RCT in 2013, large base of clinical use
  - 26-week negative RCT in 2018
  - AASM supports use for nightmares
  - Doxasozin?

UW PACC

MOOD STABILIZERS

- Mixed evidence for adjunctive use
  - Lamotrigine
    - Low, but high acceptability
  - Topiramate
    - Low evidence, limited small trials
  - Valproic acid
    - Negative, no recent evidence
  - Lithium
    - Least evidence

UW PACC

ALPHA-2 AGONISTS

- Clonidine
  - Limited RCT support
  - Some evidence for improved sleep, nightmares, daytime hyperarousal
- Guanfacine
  - No studies found for adults
  - No RCT, though case studies support use in pediatrics

UW PACC

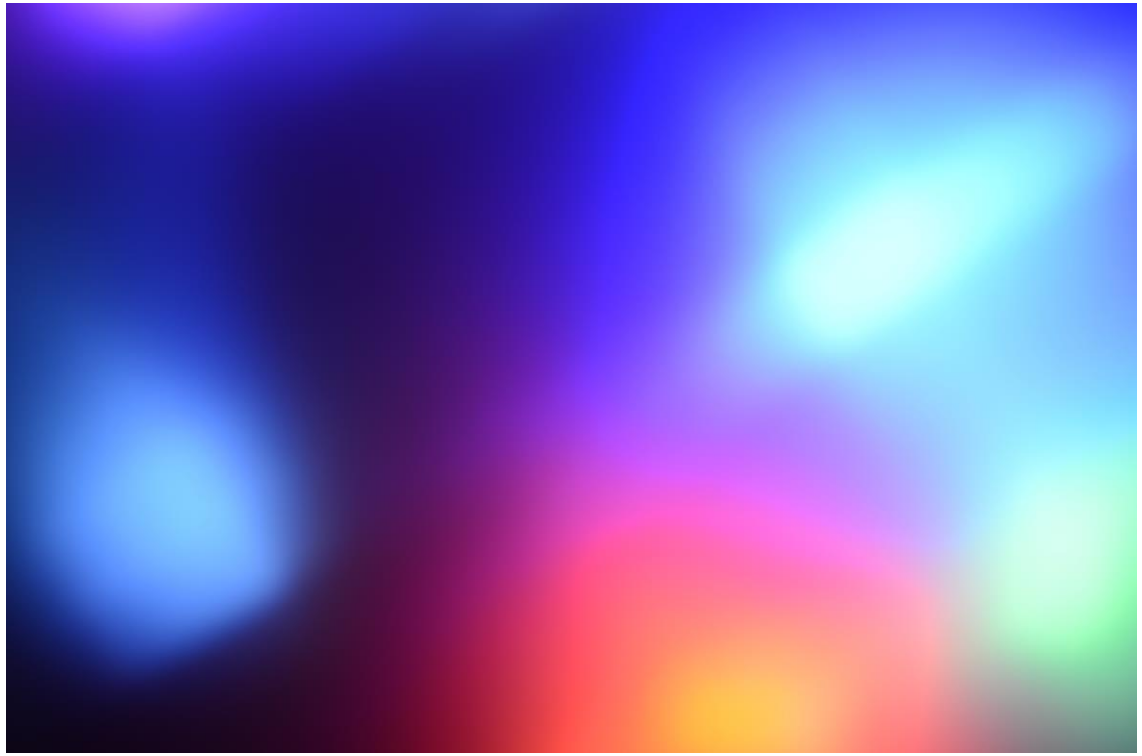
BENZODIAZEPINES

- Not recommended for use by VA
- Few recent RCTs or meta-analyses
- 2 recent meta-analyses do suggest that use worsens symptoms, including in exposure therapy setting

UW PACC

CASE STUDY- CONTINUED

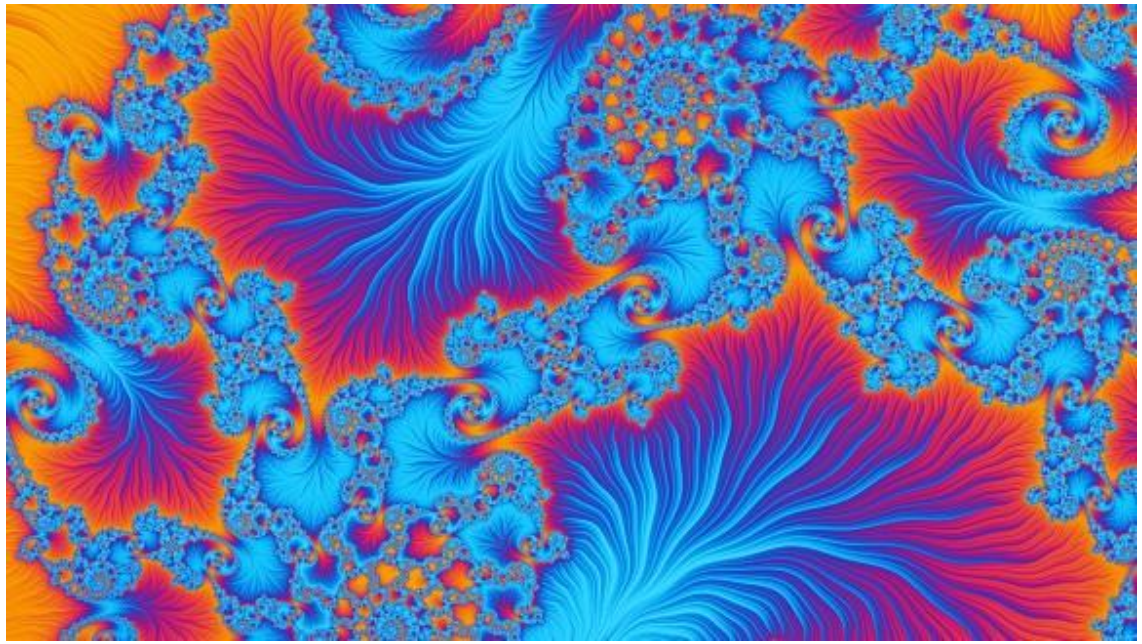
Ms. J returns to your clinic in 3 months. She still has trouble with blaming herself for the car accident and intrusive thoughts, despite the addition of brexipiprazole to sertraline. She's heard about psylocibin for PTSD and is interested to hear more about new treatments for PTSD.



UW PACC

EMERGING PTSD TREATMENTS

- Psychedelics
  - 3,4-Methylenedioxymethamphetamine (MDMA)
    - Most researched, RCTs, failed FDA approval
      - Combined with manualized therapy
      - Symptom improvement up to 12-months
      - Phase 3 trial design flaws
  - Psilocybin
    - Pilot studies and theoretical mechanisms



UW PACC

EMERGING PTSD TREATMENTS

- Ketamine
  - Mixed evidence, most recent meta-analysis was negative

- Cannabis
  - Insufficient evidence
    - Possible short-term benefits vs chronic risk

UW PACC

EMERGING PTSD TREATMENTS (CONT.)

TMS

- Multiple meta-analyses with conflicting evidence
  - One with evidence for particular kind of TMS (rDLPFC)
  - Two suggest no difference compared to placebo

Stellate Ganglion Blocks

- Limited, mixed evidence and few RCTs

Hydrocortisone

- Some evidence for IV administration immediately post trauma or in first 3 months after trauma
- Little evidence for effectiveness in chronic PTSD

THANK YOU!

UW PACC

REFERENCES

Adamou, M., Puchalska, S., Plummer, W., & Hale, A. S. (2007). Valproate in the treatment of PTSD: systematic review and meta analysis. *Current Medical Research and Opinion*, *23*(6), 1285–1291. https://doi.org/10.1185/030079907x188116

Asmundson, G. J. G., Thorisdottir, A. S., Roden-Foreman, J. W., Baird, S. O., Witcraft, S. M., Stein, A. T., Smits, J. A. J., & Powers, M. B. (2019). A meta-analytic review of cognitive processing therapy for adults with posttraumatic stress disorder. *Cognitive Behaviour Therapy*, *48*(1), 1–14. https://doi.org/10.1080/16506073.2018.1522371

Bahji, A., Forsyth, A., Groll, D., & Hawken, E. R. (2020). Efficacy of 3,4-methylenedioxymethamphetamine (MDMA)-assisted psychotherapy for posttraumatic stress disorder: A systematic review and meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *96*, 109735. https://doi.org/10.1016/j.pnpbp.2019.109735

Bajor, L. A., Balsara, C., & Osser, D. N. (2022). An evidence-based approach to psychopharmacology for posttraumatic stress disorder (PTSD) - 2022 update. *Psychiatry Research*, *317*, 114840. https://doi.org/10.1016/j.psychres.2022.114840

Berlin, H. A. (2007). Antiepileptic drugs for the treatment of post-traumatic stress disorder. *Current Psychiatry Reports*, *9*(4), 291–300. https://doi.org/10.1007/s11920-007-0035-5

Bonn-Miller, M. O., Sisley, S., Riggs, P., Yazar-Klosinski, B., Wang, J. B., Loflin, M. J. E., Shechet, B., Hennigan, C., Matthews, R., Emerson, A., & Doblin, R. (2021). The short-term impact of 3 smoked cannabis preparations versus placebo on PTSD symptoms: A randomized cross-over clinical trial. *PloS one*, *16*(3), e0246990.

Brown, R., Cherian, K., Jones, K., Wickham, R., Gomez, R., & Sahlem, G. (2024). Repetitive transcranial magnetic stimulation for post-traumatic stress disorder in adults. *The Cochrane Database of Systematic Reviews*, *8*(8), CD015040. https://doi.org/10.1002/14651858.CD015040.pub2

Campos, B., Vinder, V., Passos, R. B. F., Coutinho, E. S. F., Vieira, N. C. P., Leal, K. B., Mendlowicz, M. V., Figueira, I., Luz, M. P., Marques-Portela, C., Vilete, L. M. P., & Berger, W. (2022). To BDZ or not to BDZ? That is the question! Is there reliable scientific evidence for or against using benzodiazepines in the aftermath of potentially traumatic events for the prevention of PTSD? A systematic review and meta-analysis. *Journal of Psychopharmacology (Oxford, England)*, *36*(4), 449–459. https://doi.org/10.1177/02698811221080464

UW PACC

REFERENCES

Cirillo, P., Gold, A. K., Nardi, A. E., Ornelas, A. C., Nierenberg, A. A., Camprodon, J., & Kinrys, G. (2019). Transcranial magnetic stimulation in anxiety and trauma-related disorders: A systematic review and meta-analysis. *Brain and Behavior*, *9*(6), e01284. https://doi.org/10.1002/brb3.1284

Davis, L. L., Behl, S., Lee, D., Zeng, H., Taisa Skubiak, Weaver, S., Nanco Hefting, Larsen, K. G., & Hobart, M. (2024). Brexpiprazole and Sertraline Combination Treatment in Posttraumatic Stress Disorder. *JAMA Psychiatry*. https://doi.org/10.1001/jamapsychiatry.2024.3996

Davis, L. L., Davidson, J. R. T., Ward, L. C., Bartolucci, A., Bowden, C. L., & Petty, F. (2008). Divalproex in the Treatment of Posttraumatic Stress Disorder. *Journal of Clinical Psychopharmacology*, *28*(1), 84–88. https://doi.org/10.1097/jcp.0b013e318160f83b

de Moraes Costa, G., Zanatta, F. B., Ziegelmann, P. K., Soares Barros, A. J., & Mello, C. F. (2020). Pharmacological treatments for adults with post-traumatic stress disorder: A network meta-analysis of comparative efficacy and acceptability. *Journal of Psychiatric Research*, *130*, 412–420. https://doi.org/10.1016/j.jpsychires.2020.07.046

Department of Veterans Affairs & Department of Defense. (2023, June). *VA/DoD clinical practice guideline for management of posttraumatic stress disorder and acute stress disorder: Provider Summary*. U.S. Department of Veterans Affairs. VA/DoD_Clinical_Practice_Guideline_(CPG)_for_the_Management_of_Posttraumatic_Stress_Disorder_and_Acute_Stress_Disorder

Feder, A., Costi, S., Rutter, S. B., Collins, A. B., Govindarajulu, U., Jha, M. K., Horn, S. R., Kautz, M., Corniquel, M., Collins, K. A., Bevilacqua, L., Glasgow, A. M., Brallier, J., Pietrzak, R. H., Murrough, J. W., & Charney, D. S. (2021). A randomized controlled trial of repeated ketamine administration for chronic Posttraumatic Stress Disorder. *The American Journal of Psychiatry*, *178*(2), 193–202. https://doi.org/10.1176/appi.ajp.2020.20050596

Florido, A., Velasco, E. R., Monari, S., Cano, M., Cardoner, N., Sandi, C., Andero, R., & Perez-Caballero, L. (2023). Glucocorticoid-based pharmacotherapies preventing PTSD. *Neuropharmacology*, *224*, 109344. https://doi.org/10.1016/j.neuropharm.2022.109344

Forman-Hoffman, V., Middleton, J. C., Feltner, C., Gaynes, B. N., Weber, R. P., Bann, C., Viswanathan, M., Lohr, K. N., Baker, C., & Green, J. (2018). *Psychological and pharmacological treatments for adults With posttraumatic stress disorder: A systematic review update*. Agency for Healthcare Research and Quality (US). https://www.ncbi.nlm.nih.gov/books/NBK525132/

Hamner, M. B., Faldowski, R. A., Robert, S., Ulmer, H. G., Horner, M. D., & Lorberbaum, J. P. (2009). A preliminary controlled trial of divalproex in posttraumatic stress disorder. *Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists*, *21*(2), 89–94.

UW PACC

REFERENCES

Han, C., Pae, C.-U., Wang, S.-M., Lee, S.-J., Patkar, A. A., Masand, P. S., & Serretti, A. (2014). The potential role of atypical antipsychotics for the treatment of posttraumatic stress disorder. *Journal of Psychiatric Research*, *56*, 72–81. https://doi.org/10.1016/j.jpsychires.2014.05.003

Hanling, S. R., Hickey, A., Lesnik, I., Hackworth, R. J., Stedje-Larsen, E., Drastal, C. A., & McLay, R. N. (2016). Stellate ganglion block for the treatment of posttraumatic stress disorder: A randomized, double-Blind, controlled trial. *Regional Anesthesia and Pain Medicine*, *41*(4), 494–500. https://doi.org/10.1097/AAP.0000000000000402

Henner, R. L., Keshavan, M. S., & Hill, K. P. (2022). Review of potential psychedelic treatments for PTSD. *Journal of the Neurological Sciences*, *439*(120302), 120302. https://doi.org/10.1016/j.jns.2022.120302

Hobart, M., Chang, D., Nanco Hefting, & Davis, L. L. (2025). Brexpiprazole in combination with sertraline and as monotherapy in Posttraumatic Stress Disorder. *The Journal of Clinical Psychiatry*, *86*(1). https://doi.org/10.4088/jcp.24m15577

Kerzner, J., Liu, H., Demchenko, I., Sussman, D., Wijeysundera, D. N., Kennedy, S. H., Ladha, K. S., & Bhat, V. (2021). Stellate ganglion block for psychiatric disorders: A systematic review of the clinical research landscape. *Chronic Stress (Thousand Oaks, Calif.)*, *5*, 24705470211055176. https://doi.org/10.1177/24705470211055176

Khachatryan, D., Groll, D., Booij, L., Sepehry, A. A., & Schütz, C. G. (2016). Prazosin for treating sleep disturbances in adults with posttraumatic stress disorder: a systematic review and meta-analysis of randomized controlled trials. *General Hospital Psychiatry*, *39*, 46–52. https://doi.org/10.1016/j.genhosppsych.2015.10.007

Kothgassner, O. D., Pellegrini, M., Goreis, A., Giordano, V., Edobor, J., Fischer, S., Plener, P. L., & Huscsava, M. M. (2021). Hydrocortisone administration for reducing post-traumatic stress symptoms: A systematic review and meta-analysis. *Psychoneuroendocrinology*, *126*, 105168. https://doi.org/10.1016/j.psyneuen.2021.105168

LaFrance, E. M., Glodosky, N. C., Bonn-Miller, M., & Cuttler, C. (2020). Short and long-term effects of cannabis on symptoms of post-traumatic stress disorder. *Journal of Affective Disorders*, *274*, 298–304. https://doi.org/10.1016/j.jad.2020.05.132

Li, H., Zhang, Z., Yang, S., & Zhu, G. (2025). Systematic review and meta-analysis of propranolol in the prevention and treatment of post-traumatic stress disorder. *Frontiers in Pharmacology*, *16*, 1545493. https://doi.org/10.3389/fphar.2025.1545493

UW PACC

REFERENCES

Liu, H., Wang, X., Gong, T., Xu, S., Zhang, J., Yan, L., Zeng, Y., Yi, M., & Qian, Y. (2024). Neuromodulation treatments for post-traumatic stress disorder: A systematic review and network meta-analysis covering efficacy, acceptability, and follow-up effects. *Journal of Anxiety Disorders*, *106*, 102912. https://doi.org/10.1016/j.janxdis.2024.102912

Liu, X., Xie, X., Wang, K., & Cui, H. (2014). Efficacy and acceptability of atypical antipsychotics for the treatment of post-traumatic stress disorder: A meta-analysis of randomized, double-blind, placebo-controlled clinical trials. *Psychiatry Research*, *219*(3), 543–549. https://doi.org/10.1016/j.psychres.2014.05.027

Mallet, C., Chick, C. F., Maatoug, R., Fossati, P., Brunet, A., & Millet, B. (2022). Memory reconsolidation impairment using the β-adrenergic receptor blocker propranolol reduces nightmare severity in patients with post-traumatic stress disorder: a preliminary study. *Journal of Clinical Sleep Medicine*. https://doi.org/10.5664/jcsm.10010

Marchi, M., Grenzi, P., & Boks, M. P. (2024). Clonidine for post-traumatic stress disorder: A systematic review of the current evidence. *European Journal of Psychotraumatology*, *15*(1), 2366049. https://doi.org/10.1080/20008066.2024.2366049

Melani, M. S., Paiva, J. M., Silva, M. C., Mendlowicz, M. V., Figueira, I., Marques-Portella, C., Luz, M. P., Ventura, P. R., & Berger, W. (2020). Absence of definitive scientific evidence that benzodiazepines could hinder the efficacy of exposure-based interventions in adults with anxiety or posttraumatic stress disorders: A systematic review of randomized clinical trials. *Depression and Anxiety*, *37*(12), 1231–1242. https://doi.org/10.1002/da.23078

Mitchell, J. M., Bogenschutz, M., Lilienstein, A., Harrison, C., Kleiman, S., Parker-Guilbert, K., Ot'alora G., M., Garas, W., Paleos, C., Gorman, I., Nicholas, C., Mithoefer, M., Carlin, S., Poulter, B., Mithoefer, A., Quevedo, S., Wells, G., Klaire, S. S., van der Kolk, B., & Tzarfaty, K. (2021). MDMA-assisted Therapy for Severe PTSD: a randomized, double-blind, placebo-controlled Phase 3 Study. *Nature Medicine*, *27*(6), 1025–1033. https://doi.org/10.1038/s41591-021-01336-3

Mithoefer, M. C., Mithoefer, A. T., Feduccia, A. A., Jerome, L., Wagner, M., Wymer, J., Holland, J., Hamilton, S., Yazar-Klosinski, B., Emerson, A., & Doblin, R. (2018). 3,4-methylenedioxymethamphetamine (MDMA)-assisted psychotherapy for post-traumatic stress disorder in military veterans, firefighters, and police officers:Aa randomised, double-blind, dose-response, phase 2 clinical trial. *The Lancet Psychiatry*, *5*(6), 486–497. https://doi.org/10.1016/s2215-0366(18)30135-4

Morgenthaler, T. I., Auerbach, S., Casey, K. R., Kristo, D., Maganti, R., Ramar, K., Zak, R., & Kartje, R. (2018). Position Paper for the Treatment of Nightmare Disorder in Adults: An American Academy of Sleep Medicine Position Paper. *Journal of Clinical Sleep Medicine*, *14*(06), 1041–1055. https://doi.org/10.5664/jcsm.7178

UW PACC

REFERENCES

O'Neil, M. E., Nugent, S. M., Morasco, B. J., Freeman, M., Low, A., Kondo, K., Zakher, B., Elven, C., Motu'apuaka, M., Paynter, R., & Kansagara, D. (2017). Benefits and Harms of Plant-Based Cannabis for Posttraumatic Stress Disorder: A Systematic Review. *Annals of internal medicine*, *167*(5), 332–340. https://doi.org/10.7326/M17-0477

Prasad, S., Jain, N., Umar, T. P., Radenkov, I., Ahmed, S. K., Sakagianni, V., Kollia, S., Hingora, M. J., Kumari, N., Akbari, A. R., Renemane, L., & Bachu, A. (2023). Sympathetic nerve blocks for posttraumatic stress disorder: An evidentiary review for future clinical trials. *Frontiers in Psychiatry*, *14*, 1309986. https://doi.org/10.3389/fpsyt.2023.1309986

Rae Olmsted, K. L., Bartoszek, M., Mulvaney, S., McLean, B., Turabi, A., Young, R., Kim, E., Vandermaas-Peeler, R., Morgan, J. K., Constantinescu, O., Kane, S., Nguyen, C., Hirsch, S., Munoz, B., Wallace, D., Croxford, J., Lynch, J. H., White, R., & Walters, B. B. (2020). Effect of stellate ganglion block treatment on posttraumatic stress disorder symptoms: A randomized clinical trial. *JAMA Psychiatry*, *77*(2), 130–138. https://doi.org/10.1001/jamapsychiatry.2019.3474

Raskind, M. A., Peterson, K., Williams, T., Hoff, D. J., Hart, K., Holmes, H., Homas, D., Hill, J., Daniels, C., Calohan, J., Millard, S. P., Rohde, K., O'Connell, J., Pritzl, D., Feiszli, K., Petrie, E. C., Gross, C., Mayer, C. L., Freed, M. C., & Engel, C. (2013). A trial of prazosin for combat trauma PTSD with nightmares in active-duty soldiers returned from Iraq and Afghanistan. *The American Journal of Psychiatry*, *170*(9), 1003–1010. https://doi.org/10.1176/appi.ajp.2013.12081133

Raut, S. B., Canales, J. J., Ravindran, M., Eri, R., Benedek, D. M., Ursano, R. J., & Johnson, L. R. (2022). Effects of propranolol on the modification of trauma memory reconsolidation in PTSD patients: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *150*, 246–256. https://doi.org/10.1016/j.jpsychires.2022.03.045

Rodas, J. D., George, T. P., & Hassan, A. N. (2024). A Systematic Review of the Clinical Effects of Cannabis and Cannabinoids in Posttraumatic Stress Disorder Symptoms and Symptom Clusters. *The Journal of clinical psychiatry*, *85*(1), 23r14862. https://doi.org/10.4088/JCP.23r14862

Rodgman, C., Verrico, C. D., Holst, M., Thompson-Lake, D., Haile, C. N., De La Garza, R., Raskind, M. A., & Newton, T. F. (2016). Doxazosin XL reduces symptoms of posttraumatic stress disorder in veterans with PTSD: a pilot clinical trial. The Journal of Clinical Psychiatry, 77(5), e561-565. https://doi.org/10.4088/JCP.14m09681

Rothbaum, B. O., Price, M., Jovanovic, T., Norrholm, S. D., Gerardi, M., Dunlop, B., Davis, M., Bradley, B., Duncan, E. J., Rizzo, A., & Ressler, K. J. (2014). A randomized, double-blind evaluation of D-cycloserine or alprazolam combined with virtual reality exposure therapy for posttraumatic stress disorder in Iraq and Afghanistan War veterans. *The American Journal of Psychiatry*, *171*(6), 640–648. https://doi.org/10.1176/appi.ajp.2014.13121625

UW PACC

REFERENCES

Rosen, C. S., Greenbaum, M. A., Schnurr, P. P., Holmes, T. H., Brennan, P. L., & Friedman, M. J. (2013). Do benzodiazepines reduce the effectiveness of exposure therapy for posttraumatic stress disorder?. *The Journal of Clinical Psychiatry*, *74*(12), 1241–1248. https://doi.org/10.4088/JCP.13m08592

Sicignano, D. J., Kurschner, R., Weisman, N., Sedensky, A., Hernandez, A. V., & C. Michael White. (2023). The Impact of Ketamine for Treatment of Post-Traumatic Stress Disorder: A Systematic Review With Meta-Analyses. *Annals of Pharmacotherapy*. https://doi.org/10.1177/10600280231199666

Stanciu, C. N., Brunette, M. F., Teja, N., & Budney, A. J. (2021). Evidence for Use of Cannabinoids in Mood Disorders, Anxiety Disorders, and PTSD: A Systematic Review. *Psychiatric Services (Washington, D.C.)*, *72*(4), 429–436. https://doi.org/10.1176/appi.ps.202000189

Wang, H. R., Woo, Y. S., & Bahk, W.-M. (2014). Anticonvulsants to treat post-traumatic stress disorder. *Human Psychopharmacology: Clinical and Experimental*, *29*(5), 427–433. https://doi.org/10.1002/hup.2425

Williams, T., Phillips, N. J., Stein, D. J., & Ipser, J. C. (2022). Pharmacotherapy for post traumatic stress disorder (PTSD). *The Cochrane Database of Systematic Reviews*, *3*(3), CD002795. https://doi.org/10.1002/14651858.CD002795.pub3

UW PACC