




Disclosures

No disclosures.

Session Learning Objective

01 | Evaluate the bidirectional relationship between unhealthy alcohol use and chronic pain.

The problem: Opioids are front line treatments for chronic pain, but they don't work very well!




Pain Prevalence and Costs

- 20.4% of US adults have chronic pain (Cohen et al., 2021)
- 8.0% have high-impact chronic pain, limiting activities on most days
- Prevalence elevated among older adults, women, veterans, and those living in poverty
- Overall costs to US economy > \$600B USD/year (Institute of Medicine, 2011)
- Front line treatments have poor efficacy and significant side effects (e.g., Reinecke et al., 2015)

Key Points


2010 META-ANALYSIS



Long-term opioid management for chronic noncancer pain

(Noble et al., 2010)

2015 META-ANALYSIS



Analgesic efficacy of opioids in chronic pain: recent meta-analyses

(Reinecke et al., 2015)

- Weak evidence that opioids may provide adequate relief for some patients
- Included 26 case series and 2 RCTs
- Opioids associated ~10 pt. reduction in pain
- Likely not clinically relevant (would need to be about twice as large)
- Not significantly greater than physical therapy or psychotherapy
- Included 46 RCTs; results likely optimistic

“Opioids alone are inappropriate and multimodal treatment programs may be required.”

—Reinecke et al., 2015

Pain Self-Management with Alcohol

Self-report of alcohol use for pain in a multi-ethnic community sample

J Pain, Author manuscript; available in PMC 2010 Sep 1. Published in final edited form as: J Pain. 2009 Sep; 10(9): 944-952. doi: 10.1016/j.jpain.2009.09.005
 PMID: 19427491 | NLMID: NLM0106663 | PMID: 19712001
 Self-report of alcohol use for pain in a multi-ethnic community sample
 Joseph L. Riley, Ph.D. and Christopher King, Ph.D.
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Riley and King (2009) surveyed 4321 individuals with tooth, jaw, or arthritis pain

- Across conditions, ~25% of individuals endorsed the use of alcohol to manage pain

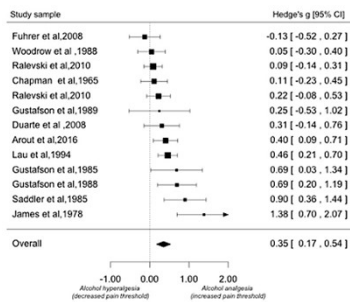
RISK FACTORS:

- Male
- Young adults
- Greater pain severity
- Higher SES
- White racial identity
- Depression
- Longer pain duration
- Use of prescription analgesics (e.g., opioids)

Analgesic Effects of Alcohol

- Anecdotal and clinical reports of alcohol's analgesic effects date back as far as 1513 (Dundee et al., 1969).
- Consistent laboratory evidence that alcohol increases pain threshold and decreases pain intensity in healthy individuals (Thompson et al., 2017).
- However, studies were often limited to men and people without chronic pain.

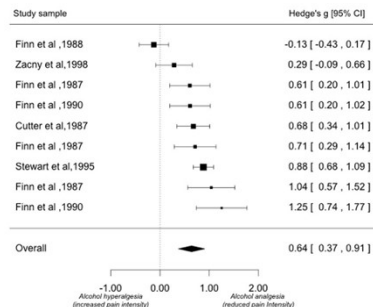
Pain Threshold



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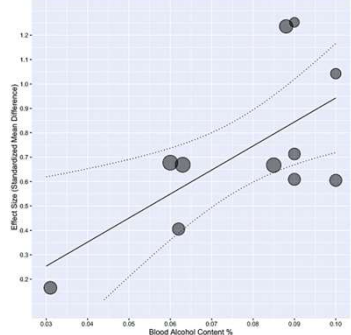
Pain Intensity Ratings



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Blood Alcohol Content % & Effect Size (SMD)

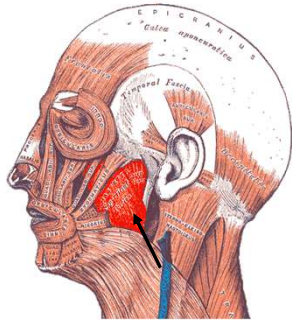


Analgesic Effects of Alcohol

- Alcohol appears to have consistent moderate-to-large analgesic effects in laboratory studies, resulting in:
 - Decreased pain intensity
 - Increased pain threshold
 - Perception of relief (Williams et al., 2021; Vitus et al., 2022)
- Initial evidence suggests:
 - Similar effects regardless of chronic pain status
 - Greater effect on perception of relief than on pain intensity or threshold
 - ~25% reduction in pain intensity vs. 500% increase in perceived relief; (Vitus et al., 2022)
- No studies have tested the analgesic effects of alcohol in older adults

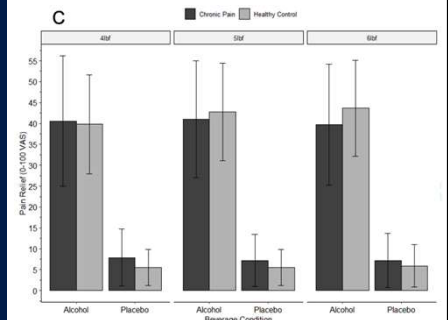
Analgesic Effects of Alcohol in Chronic Jaw Pain

- NIAAA-funded R21
- N=48 (36 women; 19 w/chronic pain) completed two double-blind testing sessions
 - Alcohol (0.08 g/dL target BrAC)
 - Placebo (0 g/dL target BrAC)
- Pressure algometry performed at masseter insertion
- Pain threshold, pain intensity, and perceived pain relief assessed using VASs



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Risks of Pain Self-Management with Alcohol

Interactions between alcohol and pain medications may have severe health consequences

- Approximately **77% of the 100** most prescribed drugs in the US have potentially harmful interactions with alcohol
- Includes drugs used for pain treatment:
 - All opioid analgesics
 - Antidepressants, including SSRIs and SNRIs (e.g., *fluoxetine*, *duloxetine*)
 - Non-steroidal anti-inflammatory drugs (e.g., *ibuprofen*, *aspirin*, *naproxen*)
 - Acetaminophen
 - Gabapentin



Risks of Pain Self-Management with Alcohol

36.8% of US adults over 65 take more than 5 medications



Pain medications, benzodiazepines, muscle relaxants among most common



Risks of Pain Self-Management with Alcohol

- Self-management of pain with alcohol likely results in hazardous drinking
- Risk of developing painful alcohol-related neuropathy (25-60% of people with AUD)
- Relief of pain provides additional negative reinforcement for alcohol use, increasing risk of developing AUD or return to use for those in recovery
- Alcohol withdrawal increases pain severity and sensitivity
- Alcohol use/misuse itself results in costs > \$200B USD/year



Health Effects of Pain Self-Management with Alcohol in Older Adults

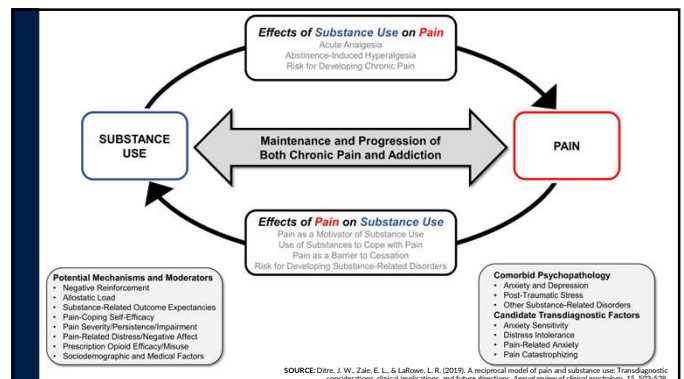
- Pain is more common and disabling among older adults with alcohol problems than those without.
- Over half of older adults with alcohol problems and moderate to severe pain report using alcohol to manage pain.
 - But it is still common among non-problem drinkers (>20%)!
- Similar rates in older men and women (Riley & King, 2009).
- Use of alcohol to manage pain was associated with more chronic health problems over time, especially among older men.

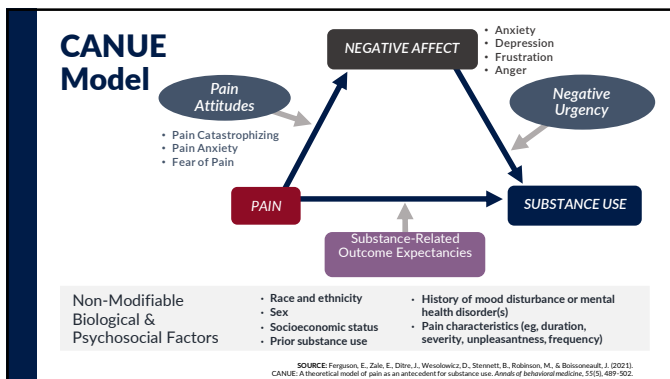
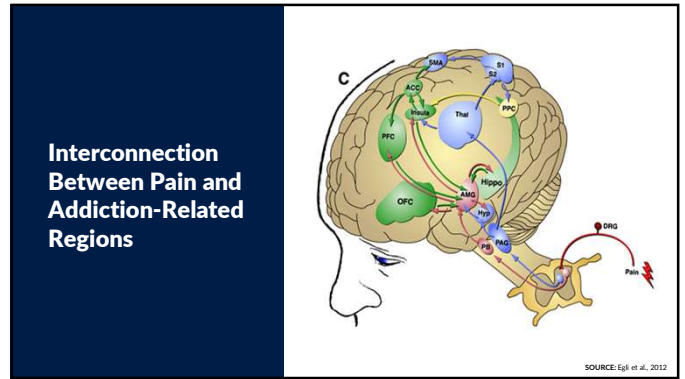
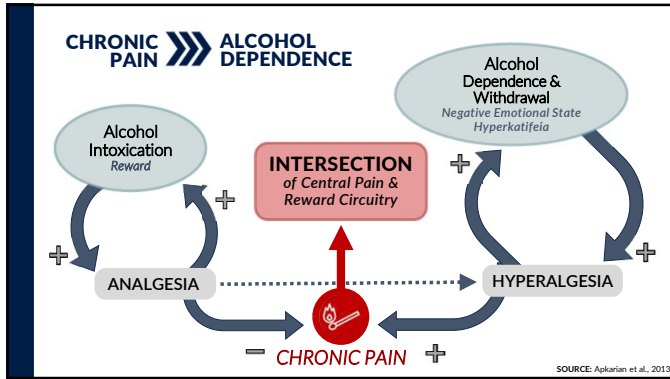


Health Effects of Pain Self-Management with Alcohol in Older Adults

Increased risk for:

- Cognitive decline/dementia (Rehm et al., 2019)
- Accidental injury and falls (Bye & Bogstrand, 2022)
- Decreased medication efficacy (Smith, 2009)
- Harmful medication-alcohol interactions (Smith, 2009)
- Chronic pain (Egli et al., 2012)
- Alcohol use disorder (Ferguson et al., 2021)
- Relapse (Witkiewitz et al., 2015)
- Mortality (Domenichiello & Ramsden, 2019; Keyes et al., 2019)





Pain and SUD Treatment/Recovery

- Chronic pain prevalence elevated among residential treatment seekers compared to community-dwelling social drinkers (53.6% vs. 32.2%); (Boissoneault et al., 2019)
- Average of 3.09 concurrent chronic pain conditions
- Higher pain severity predicted delays in age of first treatment episode (Boissoneault et al., 2019)
- Greater pain severity is associated with greater odds of return to drinking both during and after treatment (Witkiewitz et al., 2015)

Pain in Treatment-Seekers:

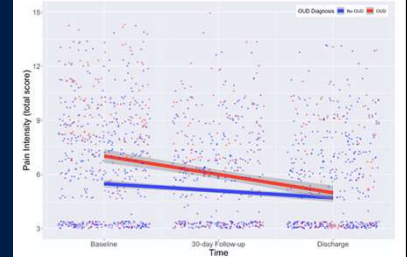
Severity and Frequency

- Out of 451 individuals with alcohol use disorder in North Central Florida (Boissonneault et al., 2019):
- 54% reported significant pain at least 1 day/week
- 63% of women vs. 47% of men ($p = .001$)
 - Mean pain severity was approximately 5 on a 10-point scale
 - Significantly more common than in community-dwelling moderate drinkers (32%; $p < .001$)
- Higher pain severity predicted a greater perceived contribution of pain to substance use

SOURCE: Boissonneault, J., Lewis, B., & Nixon, S. J. (2019). Characterizing chronic pain and alcohol use trajectory among treatment-seeking alcoholics. *Alcohol*, 75, 47-54.

Pain and SUD Treatment/Recovery

- N=811 individuals in residential SUD treatment (Ferguson et al., 2022)
- Pain assessed at baseline, 30-days, and discharge (M=66.62 days)
- Reductions in pain during treatment predicted:
 - Increases in abstinence self-efficacy for both alcohol and drugs
 - Reductions in craving
 - Reductions in depression and anxiety
 - Increases in quality of life



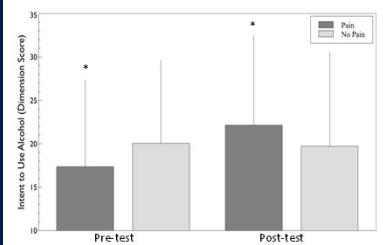
Pain Self-Management with Alcohol:

Laboratory Evidence

- Epidemiological findings supported by experimental studies
- Even in healthy individuals without chronic pain, experiencing pain:
 - Increases urge and intention to drink alcohol (Moskal et al., 2018)
 - Makes alcohol more reinforcing (Stennett et al., 2021)
 - Increases drinking speed (Gilmour et al., 2023)
 - Increases amount poured, amount consumed, and peak BAC (Ditre et al., 2023)
- Gender, pain-related attitudes, personality (e.g., impulsivity), and alcohol-related beliefs likely critical risk factors (Ferguson et al., 2021)

Effect of Pain on Urge to Drink

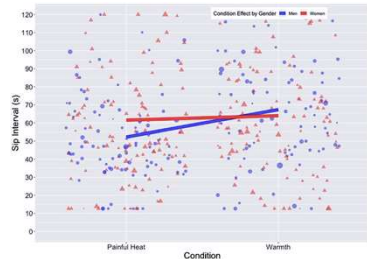
- Experimental pain induction using capsaicin and heat in healthy undergraduates (N = 61)
- Pain was associated with greater urge and intention to drink, with effects mediated by pain-induced negative affect (Moskal et al., 2018)



SOURCE: Moskal, D., Maisto, S. A., De Vita, M., & Ditre, J. W. (2018). Effects of experimental pain induction on alcohol urge, intention to consume alcohol, and alcohol demand. *Experimental and Clinical Psychopharmacology*, 24(1), 45-74.

Effect of Pain on Drinking Topography

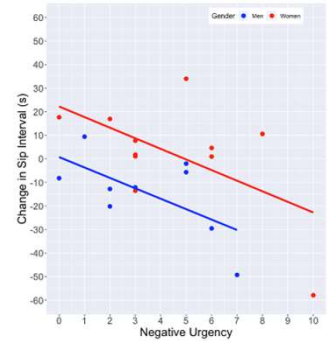
- Pain and Alcohol in Virtual Reality (PAVR) Study (Gilmour et al., 2023)
- N=20 (11 women) completed two 15-minute alcohol self-administration sessions in VR
 - Heat pain (44°C)
 - Non-noxious warmth (38°C)
- Drinking topography compared between sessions using multilevel modeling



SOURCE: Moskal, D., Mäkitö, S. A., De Vita, M., & Ditre, J. W. (2018). Effects of experimental pain induction on alcohol urge, intention to consume alcohol, and alcohol demand. *Experimental and Clinical Psychopharmacology*, 24(1), 45-76.

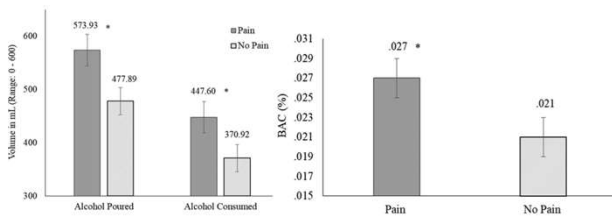
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Effect of Pain on Alcohol Consumption



- N=237 community-dwelling heavy drinkers (M=3.26 drinks/day) (Ditre et al., 2023)
- 15-minute alcohol taste test paradigm while experiencing heat pain
- Pain increased amount poured, amount consumed, and BAC, especially in men

SOURCE: Ditre, J. W., Lilloree, L. R., Powers, J. M., White, K. M., Paladino, M. B., Zvolensky, M. J., ... & Mäkitö, S. A. (2023). Pain as a causal motivator of alcohol consumption: Associations with gender and race. *Journal of Psychopathology and Clinical Science*, 132(1), 101.

Next Steps: Identifying Vulnerable Patients

J Orthop Sports Phys Ther. 2019;49(5):327-43. doi: 10.2519/jospt.2016.6487 [pub 2019 Mar 21]

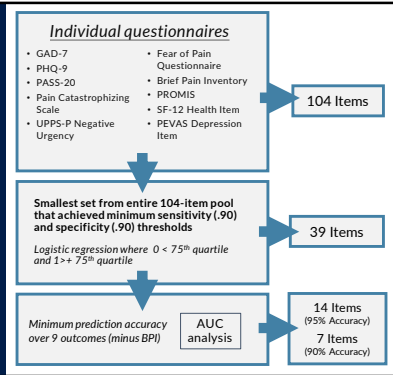
Development of a Yellow Flag Assessment Tool for Orthopaedic Physical Therapists: Results From the Optimal Screening for Prediction of Referral and Outcome (OSPRO) Cohort

Trenor A, Lantz, Jason M, Beneckuk, Israf E, Balabeky, Giorgio, Zeppieri Jr, Yunfeng Dai, Samuel S Wu, Steven G George.
PMID: 2699408 DOI: 10.2519/jospt.2016.6487



CANUE Screening Tool

- Data collected on Amazon's Mechanical Turk (Bush et al., in press)
- Measures:
 - Negative affect *depression, anxiety, anger*
 - Negative urgency
 - Pain catastrophizing
 - Pain
 - Fear of pain
- Logistic regression models to predict >=75%ile
- AUC analysis to find optimal reduced itemset



Sample Characteristics (n=520)

Substance	Mean Risk Score (SD)	Interpretation	N (%)
Tobacco	15.1 (9.75)	Moderate	357
Alcohol	16.7 (11.1)	Moderate	438
Cannabis	13.8 (11.4)	Moderate	270
Street Opioid	19.4 (12.4)	Moderate	93
Prescription Opioids	15.0 (13.2)	Moderate	152

- Mostly young (median = 35, SD = 12.8)
- Female (51.5%)
- Cis-Gender (83.3%)
- White (86%)
- Non-Hispanic (87.6%)
- Employed (91.4%; median income = \$50,000)

CANUE-14 vs. CANUE-7

Item	Label
FPQ #12	Fear of burning your fingers with a match
FPQ #16	Fear of having an eye doctor remove a foreign particle from your eye
GAD #1	Feeling nervous, anxious, or on edge
GAD #4	Trouble relaxing
PASS #12	When I feel pain, I am afraid something terrible will happen
PCS #3	It's [pain] terrible, and I think it's never going to go away
PEVAS Depression Item	What is your current level of depression?
PHQ #5	Poor appetite or overeating
PHQ #9	Thoughts that you would be better off dead, or of hurting yourself in some way
PROMIS Anger Subscale #1	I was irritated more than people knew
PROMIS Anger Subscale #4	I was grouchy
SF12 Health Item	In general, you would say your health is ...
UPPSP #15	When I feel rejected, I will often say things I later regret
UPPSP #6	When I feel bad, I will often do things I later regret in order to make myself feel better now

Substance Use Risk Score

Substance	Intercept	Slope	p-val	R ²
Tobacco	15.13	.52	<.001	.288
Alcohol	17.37	.66	<.001	.344
Cannabis	14.06	.65	<.001	.346
Street Opioids	15.38	.76	<.001	.344
Prescription Opioids	12.87	.72	<.001	.306

Percent of Use Because of Pain (Past Three Months)

Substance	Intercept	Slope	p-val	R ²
Tobacco	30.13	2.04	<.001	.444
Alcohol	31.43	1.89	<.001	.358
Cannabis	36.16	1.95	<.001	.322
Street Opioids	37.65	2.35	<.001	.401
Prescription Opioids	33.41	2.05	<.001	.314

Conclusions

1

Alcohol intake provides short-term analgesic effects in laboratory settings.

4

AUD increases risk for chronic pain, and vice versa.

2

Current evidence suggests pain increases the motivation to use alcohol, increases the reinforcing efficacy of alcohol, and alters both how and how much individuals drink.

2

However, associations between AUD and chronic pain remain incompletely understood.

5

3

Substantial overlap in brain regions and networks underlie chronic pain and AUD.

FOR EXAMPLE

How might bidirectional association between alcohol and pain differ across the lifespan?

Acknowledgments

Collaborators

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Knowledge Check

Which of the below has NOT been proposed to be a critical component of the bidirectional association between alcohol use and pain?

A

Negative reinforcement

B

Positive reinforcement

C

Negative urgency

D

Pain quality and severity

Knowledge Check

Which of the below has NOT been proposed to be a critical component of the bidirectional association between alcohol use and pain?

- | | |
|--|---|
| <p>A</p> <p>Negative reinforcement X</p> | <p>B</p> <p>Positive reinforcement ✓</p> |
| <p>C</p> <p>Negative urgency X</p> | <p>D</p> <p>Pain quality and severity X</p> |

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