

Ohio Society of Addiction Medicine
Annual Meeting
October 13, 2023

METHAMPHETAMINE ADDICTION TREATMENT

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LEARNING OBJECTIVES

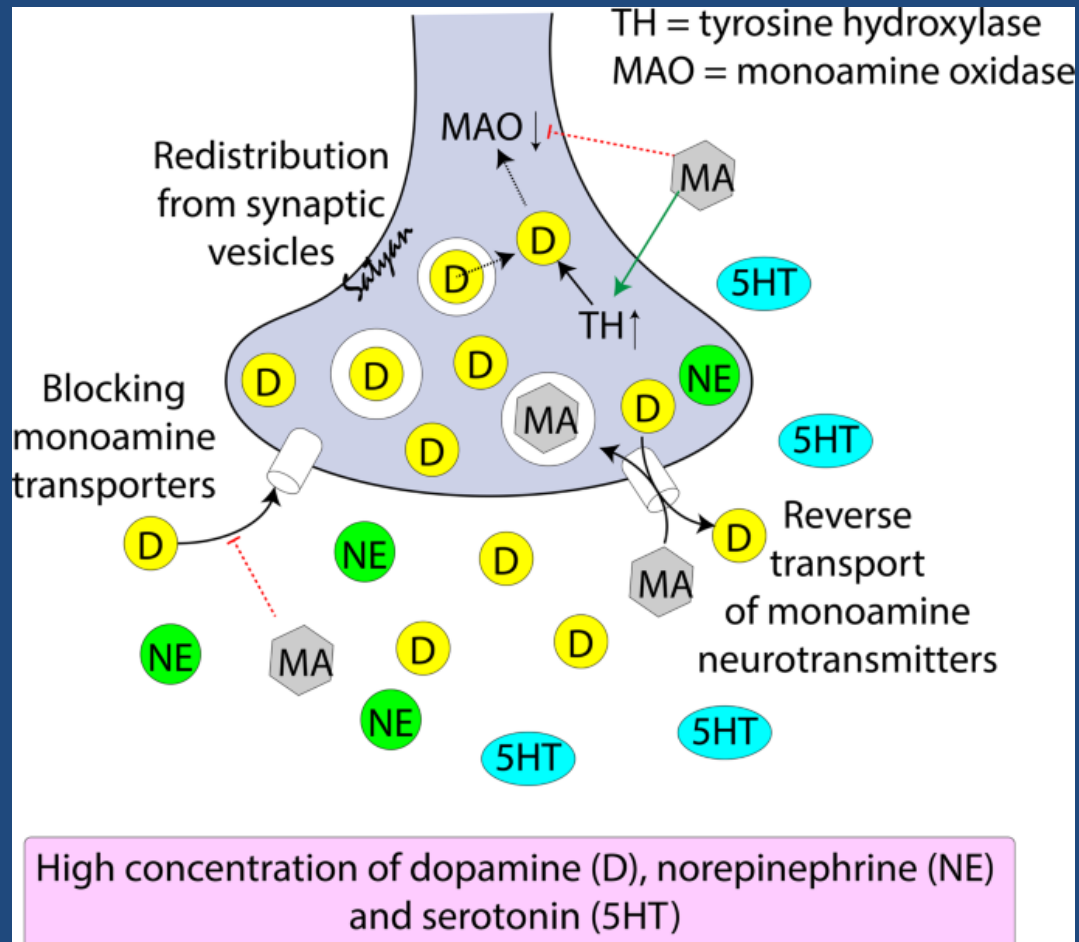
- Discuss problems resulting from use of methamphetamine.
- Discuss different behavioral and medication treatments for stimulant use disorder.

METHAMPHETAMINE

- Potent, long-acting stimulant
- Synthesized in clandestine labs directly for illicit use
 - Western U.S.
 - Mexico
- 14.5 million adults in U.S. have used methamphetamine
 - 5.4% of population
- Nearly 1 million current users in U.S.



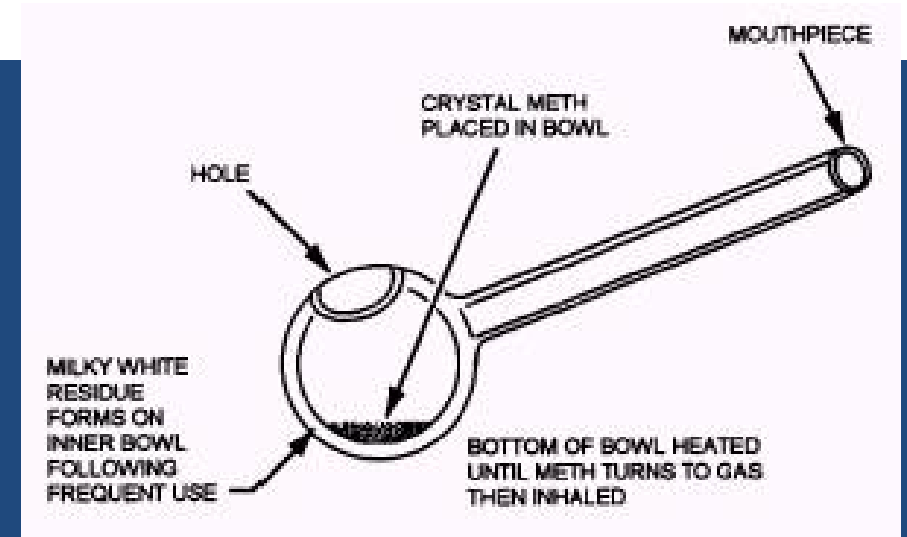
MECHANISMS OF ACTION



- Bind to dopamine transporter (reuptake pump) on presynaptic neuron and reverses pump
- Increase release of excitatory neurotransmitters from intracellular vesicles
- Inhibit monoamine oxidase in synaptic cleft

ADMINISTRATION & PATTERNS OF USE

- Users may start with oral route
 - Low risk, but less 'rush' (euphoria)
- Intranasal insufflation (snorting, sniffing)
- Most dangerous
 - Smoking
 - Injection (especially intravenous)
- Users average 1-7 binges per week
 - Each lasts 4-24 hours
 - May re-administer every 10-30 minutes
 - 'run,' 'spree'



UNDESIRABLE ACUTE EFFECTS



- tachycardia, hypertension, arrhythmia
- insomnia, panic attacks, psychosis
- hyperpyrexia
- seizures
- malignant hypertension
 - Cerebrovascular accident
 - Myocardial infarction

TREATMENT OF INTOXICATION

- Verbal reassurance
- Quiet environment
 - Limit stimulation
- Sedate for severe agitation, anxiety
- Antipsychotic medication if necessary
- Cardiac monitoring
 - Heart rhythm problems
 - High blood pressure



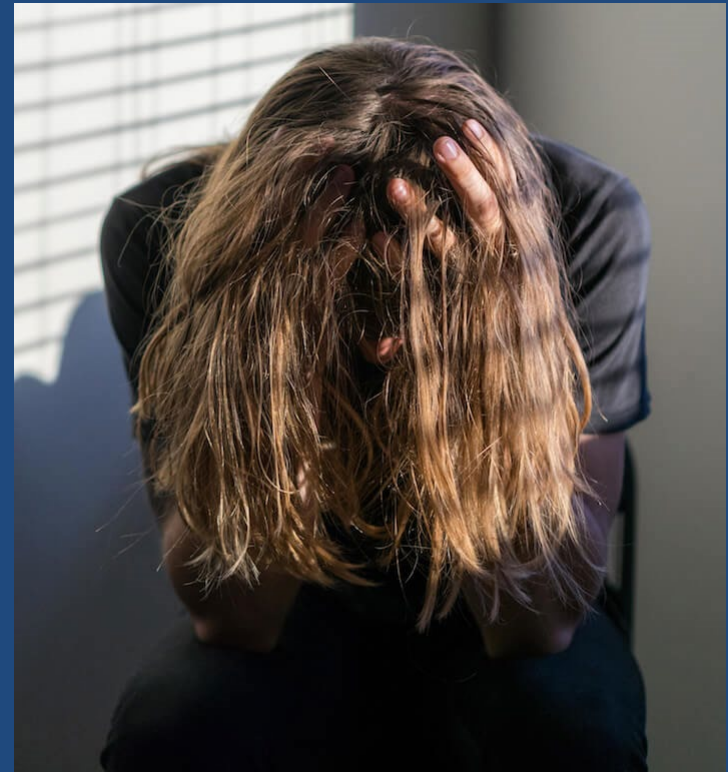
PSYCHIATRIC MANIFESTATIONS



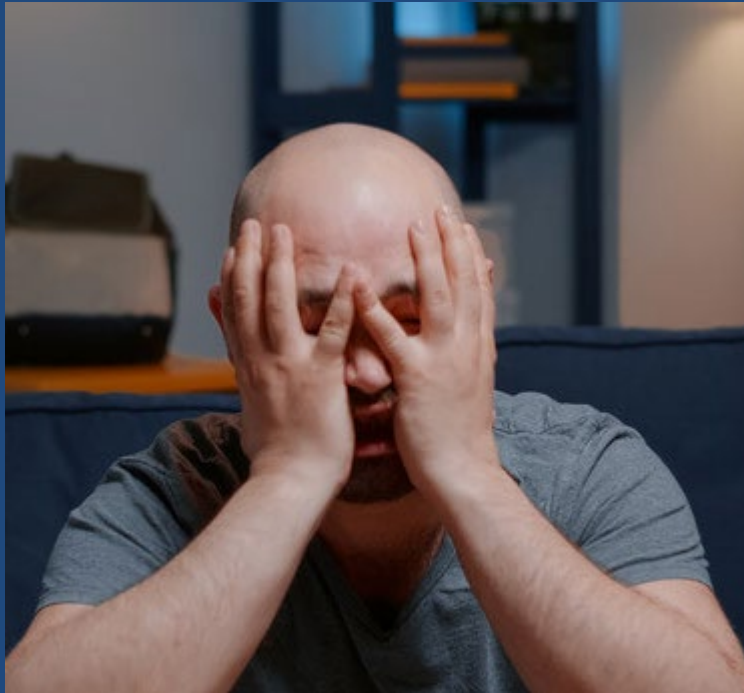
- Psychiatric consultation
- May require inpatient treatment of psychosis
 - Often resolves as methamphetamine intoxication effects subside
- Psychiatric symptoms that persist >1 week
 - May be co-occurring primary psychiatric disorder
 - Early unmasking due to methamphetamine use

STOPPING METHAMPHETAMINE

- Stimulant withdrawal syndrome
 - Irritability
 - Depression
 - Hypersomnolence
 - Hyperphagia (“the munchies”)
- No significant physical withdrawal symptoms
- Can stop prescribed stimulants without tapering
- Care is supportive
 - No pharmacotherapy



PHASES OF WITHDRAWAL



- Phase I – Crash
 - Craving, depression, anxiety
 - Like hangover after alcohol binge
- Phase II
 - Anhedonia, malaise, impaired concentration
 - Like other drug withdrawal syndromes
- Phase III – Extinction
 - Intermittent conditioned craving
 - Lasts months to years

WHY IS IT SO HARD TO QUIT?

- Stimulants (methamphetamine and others) are powerful reinforcers
 - Most potent reinforcing agents known
 - Pairs stimuli around user with euphoria of use
- Craving
 - Caused by vivid memories of numerous periods of extreme euphoria during a binge
 - Set off by environmental cues (triggers)
- Neurochemical changes create psychological dependence that leads to recurrent use
 - Users feel drug is essential to normal functioning

PHARMACOLOGIC TREATMENTS FOR METHAMPHETAMINE USE DISORDER

- Desipramine
- Imipramine
- Monoamine oxidase inhibitors
- Fluoxetine
- Trazodone
- Haloperidol
- Flupenthixol
- Lithium
- Methylphenidate
- Levodopa
- Bromocriptine
- Amantidine
- Carbamazepine
- Valproate
- Topiramate
- Mazindol
- Naloxone
- Buprenorphine
- Methadone

Many tried, none effective

POSSIBLE NEW MEDICATION COMBINATION?

- Accelerated Development of Additive Pharmacotherapy Treatment (ADAPT) for Methamphetamine Use Disorder
- Sponsored by National Institute on Drug Abuse Clinical Trials Network (NIDA CTN)
- High-dose bupropion
 - Depression medication
- High-frequency naltrexone injections
 - Opioids, alcohol
- 400 subjects with daily methamphetamine use
- Multiple sites throughout U.S.
- Published positive findings
- Replication trials currently underway



BEHAVIORAL TREATMENT

- Mutual-help groups
 - 12-Step (Narcotics Anonymous)
 - SMART Recovery
- Counseling
 - Individual
 - Facilitated groups
- Contingency Management
- Family therapy
- Intensive outpatient
- Residential



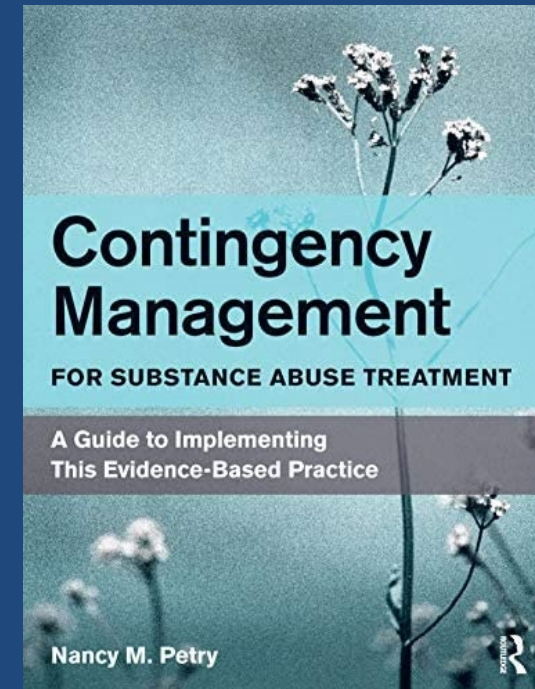
CONTINGENCY MANAGEMENT

- Behavioral therapy that has shown success for stimulant addiction and others
- “Paying addicts to stay clean”
- Reduce drug use by systematically increasing availability & frequency of alternative reinforcing activities
- Contingencies are contrived
 - Put in place explicitly & exclusively for therapeutic purposes
- Earn something of value contingent upon a specific result
 - Urine sample negative for illicit drug(s)
 - Attending therapy sessions
 - Completing homework assignments

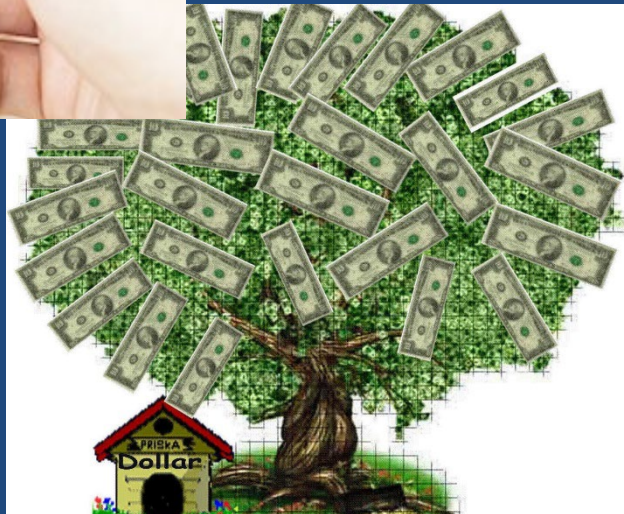


CONTINGENCY MANAGEMENT THEORY

- Contrived sources of alternate reinforcement delivered through CM are designed to promote initial abstinence
- Allow time for patient & therapist to work toward reestablishing more naturalistic alternatives to drug use
 - Employment
 - Stable family life
 - Social connections that reinforce abstinence
- Naturalistic alternatives sustain long-term abstinence after contrived reinforcers are discontinued



EXAMPLE OF CONTINGENCY MANAGEMENT



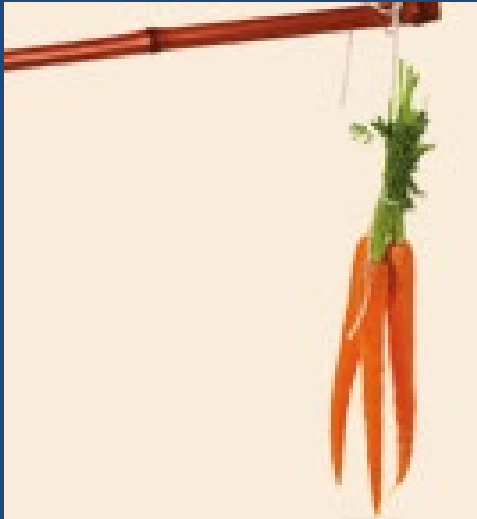
- Voucher-based system to give positive rewards for staying in treatment and giving urine samples that are negative for drugs
- Exchange vouchers for items that encourage healthy living
- Drug-free lifestyle goals eventually replace need for vouchers as rewards
- Expensive, but less than costs to society of methamphetamine use

PAYING ADDICTS (LESS) TO STAY CLEAN

- Contingency Management strategies effective for treating addiction
- Expensive
- Prize-based CM less expensive
- Earn chance to draw chip for a prize (0-\$100) for each urine sample without illicit drugs
- Number of draws increases as number of weeks of abstinence increases



BARRIERS TO CONTINGENCY MANAGEMENT



- Adoption rates for CM are low in community OUD clinics
 - Competing staff priorities
 - Insufficient training
 - Philosophical objections
 - Staff turnover
 - Insufficient funding

MINDFULNESS

- Derived from philosophies concerning cultivation of awareness
- Practices designed to evoke a state of mindfulness
- Focused attention
 - Concentrate on breathing
- Acknowledge and disengage from distracting thoughts and emotions
- State of metacognitive awareness
- Moment-by-moment monitoring
 - Cognition
 - Emotion
 - Sensation
 - Perception
- Attentive and nonjudgmental
- No perseveration on thoughts of past and future



MINDFULNESS AND ADDICTION

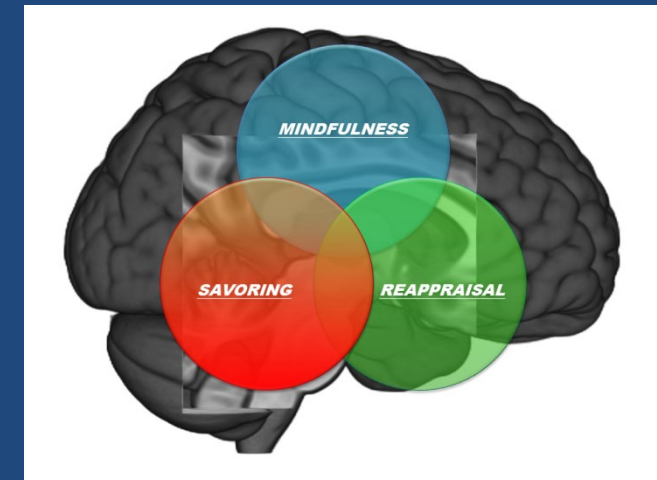
- Mindlessness
 - Characteristic of addiction
 - Habitual responses
 - Automatic behavior
 - No regard for consequences
- Mindfulness
 - Remain nonreactive
 - Accept distressing thoughts and emotions



- Mindfulness enhances capacity for cognitive control
- Reduces substance use and craving
- Mindfulness originally focused on reducing emotional distress
 - Stress
 - Chronic pain
 - Depression
- Mindfulness meditation leads to changes in brain structure

MINDFULNESS-BASED INTERVENTIONS

- Practices
 - Mindful breathing
 - Body scan meditation
 - Debrief as group
- Chocolate exercise
 - Compare with craving for drugs
- Mindfulness de-automatizes addictive behavior
 - Deconstruct craving
 - Adaptively respond to urge rather than automatically react to cues to use
- Group therapy format
- Weekly sessions for around 8 weeks
 - Psychoeducational material
 - Homework exercises
- Guided by trained clinician
 - Requires intensive instructor training



SMARTPHONE APPS

- Recovery-based applications (apps) for smartphones combine evidence-based research and technology
- 24/7 access to support and connection
- Doesn't require interpersonal interaction

- Features
 - Track sobriety
 - Monitor triggers
 - Connect with peers in recovery
 - Access information
 - Keep a journal



SUMMARY

- Stimulants 'rev up' the body and mind
- Different types of addiction treatment are available, which are successful and cost-effective
- Contingency management uses motivational incentives (gift cards, vouchers, prize chips) to reinforce specific patient treatment-related behaviors such as keeping appointments or negative drug screens
- Mindfulness helps resist cravings and disrupt automatic behaviors of using drugs
- Smartphone apps help reinforce treatment compliance

REFERENCES

- Miller SC, et al: *Principles of Addiction Medicine*, 6th Ed., New York: Wolters Kluwer, 2019
- Weaver MF: *Addiction Treatment*. Carlat Publishing, 2017
- Trivedi MH, et al: Bupropion and naltrexone in methamphetamine use disorder. *N Engl J Med* 2021;384(2):140-153
- Roll JM, et al: Contingency management for the treatment of methamphetamine use disorders. *Am J Psychiatry* 2006;163:1993
- Maneesang W, et al: Effectiveness of Mindfulness-Based Therapy and Counseling programs (MBTC) on relapses to methamphetamine dependence at a substance dependency treatment center. *Psychiatry Res* 2022;317:114886

QUESTIONS?

