



Center on
Rural Addiction
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Evidence-based treatments for stimulant use disorder

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Methamphetamine “Al-Shaboo,”



Paulus, M. P. and Stewart, J.L. ,
Neurobiology, Clinical Presentation and Treatment of
Methamphetamine Use Disorder:
A Review. JAMA Psychiatry, 77:959-966.
doi:10.1001/jamapsychiatry.2020.02462020

Methamphetamine neurotoxicity

- Excessive dopamine resulting in damaged cell structures
- Cell death
- Activation of dopamine D3 receptors resulting in hyperthermia
- Disruption of the blood-brain barrier
- Overall, the altered brain state is consistent with degenerative central nervous system diseases.

Cognitive effects

Soon after cessation of methamphetamine use:

- Poor performance on motor and processing tasks
- Poor performance on verbal fluency and attention

After prolonged abstinence:

- Poor learning efficiency and comprehension
- Poor visual-spatial processing
- Slow processing and psychomotor speed

Impairment may limit ability to follow through with treatment, comprehend advice and direction in treatment

Cerebrovascular and cardiovascular disease

Leading causes of death with methamphetamine use disorder:

- Strokes on rise, most often with young men
- Strokes are primarily hemorrhagic

Cardiovascular disease associated with methamphetamine use:

- Pulmonary hypertension
- Cardiac arrhythmia
- Cardiomyopathy

Clinical Challenges: Treating Individuals with Stimulant Use Disorder

- Overdose death/Lethality of currently available methamphetamine
- Limited understanding of stimulant addiction
- Ambivalence about need to stop use
- Impulsivity/Poor judgement
- Cognitive impairment and poor memory
- Anhedonia

Clinical Challenges

Treating Individuals with Stimulant Use Disorder

- Hypersexuality/Hyposexuality
- Violence and psychosis
- Powerful Pavlovian trigger-craving response
- Elevated rates of psychiatric co-morbidity
- Very difficult to engage in treatment
- Very poor retention in outpatient treatment

Treatment for Stimulant Use Disorder

Medications



There are currently no FDA-approved medications for treating individuals with stimulant use disorder

Medications for Methamphetamine Use Disorder

Medications with positive studies and under consideration

Bupropion/naltrexone
mirtazapine

bupropion
naltrexone
methylphenidate
d-amphetamine
topiramate

Behavioral/Psychosocial Treatments

Current Status of Treatment Approaches for Methamphetamine Use Disorder

- **Contingency management unanimously (7 systematic reviews and meta-analyses) found to have the most robust evidence of effectiveness.**
- Other approaches with lesser but evidence of support: Cognitive Behavioral Therapy (CBT) and Community Reinforcement Approach (CRA)
- Approach with recent studies showing benefit to individuals with methamphetamine use disorder: Physical Exercise (PE). (e.g. Rawson et al, 2015)

Contingency Management Systematic Reviews and Meta-analyses

Contingency Management

A technique employing the systematic delivery of positive reinforcement for desired behaviors. In the treatment of stimulant use disorder, giftcards or other tangible reinforcers can be “earned” for submission of methamphetamine-free urine samples or for other target behaviors.

RESEARCH ARTICLE

Comparative efficacy and acceptability of psychosocial interventions for individuals with cocaine and amphetamine addiction: A systematic review and network meta-analysis

Franco De Crescenzo ^{1,2,3}, Marco Ciabattini ⁴, Gian Loreto D'Alò ⁴, Riccardo De Giorgi ^{1,2}, Cinzia Del Giovane⁵, Carolina Cassar⁶, Luigi Janiri³, Nicolas Clark ⁷, Michael Joshua Ostacher ^{8,9}, Andrea Cipriani ^{1,2*}



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De Crescenzo et al, 2018: Meta-Analysis Findings

Network meta-analysis was used to analyze 50 clinical studies (6,943 participants) on 12 different psychosocial interventions for cocaine and/or amphetamine addiction.

Contingency management was the most efficacious and most acceptable treatment both in the short and long term.

Non-pharmacological interventions for methamphetamine use disorder: a systematic review

Drug and Alcohol Dependence, (AshaRani,et al. 2020)

- 44 Studies reviewed.
- Conclusions: Contingency Management (CM) interventions showed the strongest evidence favoring the outcomes assessed

Contingency Management for the Treatment of Methamphetamine Use Disorder: A Systematic Review

Drug and Alcohol Dependence (Brown and DeFulio, 2020)

- A review of 27 studies.
- All included a contingency management intervention for individuals who use methamphetamine.
- Outcomes:
 - Drug abstinence
 - Retention in treatment
 - Attendance/treatment engagement
 - Sexual risk behavior
 - Mood/affect
 - Treatment response predictors

Brown and Di Fulio (2020):Results

- Reduced methamphetamine use in 26 of 27 studies.
- Longer retention in treatment.
- More therapy sessions attended; higher use of medical and other services.
- Reductions in risky sexual behavior.
- Increases in positive affect and decreases in negative affect.

Contingency Management

A technique employing the systematic delivery of positive reinforcement for desired behaviors. In the treatment of stimulant use disorder, vouchers or giftcards can be “earned” for submission of methamphetamine-free urine samples or for completion of other target behaviors.

Characteristics of Effective Reinforcement

-
- Clearly defined and achievable behavior
 - Desirable and tangible incentive
 - Timely pairing of behavior and recovery incentive
 - Contingent (incentives provided only when behavior is demonstrated)
 - Consistent (behavior is frequently observed and incentivized)

Essential components of contingency management

1. Clearly Define the Target Behavior

- **Focused:** does not require abstinence from other substances, only stimulants
- **Objective:** does not rely on self-report, relies on UAs
- **Immediate results:** essential for positive reinforcement
- **Feasible:** cost effective for frequent use, does not take specialized training
- **Achievable:** a 2 to 4-day stimulant metabolite detection window means rewards can be earned within first few days of abstinence

Current Recommendation: Stimulant abstinence measured by
point-of-care urinalysis (UA)

2. Frequently Measure the Behavior

- Collect urine tests and provide recovery incentives:
 - ***2 x per week for weeks is recommended***
- Communicate attendance requirements (missed visit means missed opportunity for reward and reset of recovery incentive value to baseline)
- Schedule on non-sequential days (e.g., Mon/Thurs or Tues/Fri)



3. Provide Desirable/Immediate Rewards

Desirable:

- Vendor will provide a wide array of options for recovery incentives
- Starting value of \$10 per stimulant-negative UA, increasing by \$1.50 for every week of non-use of stimulants (i.e., two consecutive stimulant-negative UAs)

Immediate:

- Incentives will be electronically delivered, with the option to print gift cards onsite for those without reliable access to technology

4. Contingent AND Positive

Contingent:

- No incentive given when urine test is not submitted or is positive for stimulants

Positive:

- Encouragement/support is offered without punishment even if the urine drug test is positive for stimulants

Contingency Management Apps

- AFFECT Therapeutics <https://www.affecttherapeutics.com>
- CHESS HEALTH <https://www.chess.health>
- DYNAMICARE Health <https://www.dynamicarehealth.com>
- Q2i Digital Health <https://q2i.com/>

Other Behavioral Treatments with Support

Cognitive Behavioral Therapy (CBT)

- CBT is a form of “talk therapy” that is used to teach, encourage, and support individuals about how to reduce / stop their harmful drug use.
- CBT provides skills that are valuable in assisting people in gaining initial abstinence from drugs (or in reducing their drug use).
- CBT also provides skills to help people sustain abstinence (relapse prevention)

The 5 Ws (aka functional analysis)

- The time periods when the client uses drugs
- The places where the client uses and buys drugs
- The external cues and internal emotional states that can trigger drug craving (why)
- The people with whom the client uses drugs or the people from whom she or he buys drugs
- The effects the client receives from the drugs – the psychological and physical benefits (what happened)

Community Reinforcement Approach


Community Reinforcement Approach (CRA) is a combination of behavioral strategies that address the role of environmental contingencies in encouraging or discouraging drug use and attempts to rearrange these contingencies so that a non-drug using lifestyle is more rewarding than a using one.

Components of CRA

CRA components include:

- behavioral skills training
- social and recreational counseling
- marital therapy
- motivational enhancement
- job counseling
- relapse prevention

A sample of CRA Topics

- Functional Analysis
 - Drug Refusal Skills
 - Social Skills/Assertiveness Training
 - Social Recreational Counselling
 - Employment Preparation Skills
 - Relationship Happiness Scale
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Matrix Model and TRUST

Matrix Model is a combination of behavioral therapies including: CBT; patient education, family therapy, motivational interviewing.

TRUST is a recent combination approach that combines elements of the CBT materials from the Matrix Model, with an incentive program and a program of exercise.

Each of these programs has a structured patient workbook and therapist manual.

Exercise as a Treatment Intervention for Methamphetamine Dependence







Exercise Summary

For individuals in the first 100 days of meth recovery, exercise:

- Improves physical conditioning
- Reduces weight gain
- Improves cardiovascular functioning (increases heart rate variability)
- Reduces symptoms of anxiety and depression
- Reduces craving for methamphetamine
- Enhances recovery of dopamine system
- Reduces relapse to methamphetamine post discharge (except in very heavy users)

Exercise References

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Hang Su, Tianzhen Chen, Haifeng Jiang, Na Zhong, Jiang Du, Ke Xiao, Ding Xu, Weidong Song, Min Zhao, (2020) Intermittent theta burst transcranial magnetic stimulation for methamphetamine addiction: A randomized clinical trial, European Neuropsychopharmacology, 31, 158-161, ISSN 0924-977X,

Hang Su et al (2020): Results

Intermittent theta burst stimulation (iTBS), a new form of rTMS, was applied in a large sample at four clinical centers. 126 participants (age 31.64 ± 6.33 ; 106 men) with severe methamphetamine use disorder.

Results:

- iTBS reduced **cue-induced craving in patients with severe methamphetamine use disorder.**
- iTBS improved cognitive function in patients with severe methamphetamine use disorder.
- iTBS improved sleep quality in patients with severe methamphetamine use disorder.

Conclusions

- Cocaine and methamphetamine use are a serious public health problems.
- Contingency management is an evidence-based intervention with robust evidence of efficacy.
- There are other promising treatments including: CBT, CRA, exercise and transcranial magnetic stimulation.
- More research is needed on the epidemiology of stimulant use, medications for stimulant use disorder and cultural adaptation of evidence-based treatments.



QUESTIONS
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