



# Stimulant-Related Disorders

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## Introduction

The substances of abuse in stimulant-related disorders include cocaine, methamphetamine, amphetamines, and synthetic cathinones. Users enjoy stimulants because of the effects of euphoria, increased energy, and elevated libido stimulants can bring about. The stimulant withdrawal syndrome, known as a crash, can be marked by dysphoria and hypersomnia. For many users, withdrawal can be unpleasant enough to trigger cravings for continued use of stimulants. Cravings, in turn, can lead to repeated use of stimulants, paving the way to development of a stimulant-related disorder.

Data from a national survey in the United States show that about 977,000 people aged 12 or older met criteria in 2018 for cocaine use disorder [1]. More people use cocaine than any other illegal drug in the United States aside from cannabis, with an additional four million people using cocaine in the past year but not meeting criteria for a use disorder [2]. Prevalence of cocaine use is highest among white men in their 20s, those who were previously married, those unemployed, those living in nonrural areas, and those who did not complete high school [3].

About 1.1 million people aged 12 or older met criteria in 2018 for methamphetamine use disorder [1]. It has been reported that 4.7 million Americans have tried methamphetamine at some point in their lives [4]. Men have been found to have a higher three-year prevalence rate than women [5]. In the United States, rates of methamphetamine use have historically been highest in the western and mid-western regions [6].

About 561,000 people aged 12 or older met criteria in 2018 for prescription stimulant use disorder [1]. Amphetamines are prescribed for several conditions, including attention-deficit/hyperactivity disorder, narcolepsy, and weight loss. Diversion of prescribed amphetamines can contribute to misuse and abuse of

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amphetamines. An estimated 5.3 million people in the United States had misused prescription stimulants within the preceding year [2]. Measures have been taken to create long-acting formulations of prescribed stimulants to lower their potential for abuse.

Use of synthetic cathinones (bath salts) is much lower in prevalence compared to that of the other three types of stimulants.

Patients with stimulant-related disorders can present for care in the outpatient setting or be admitted to an inpatient unit for treatment. For example, patients can present to ambulatory substance abuse clinics on their own volition, with encouragement from loved ones, or be referred there by the courts. Patients with stimulant-related disorders can also present to emergency departments and then be admitted to inpatient units. For example, during the intoxication phase, some stimulant users can become aggressive or experience psychosis characterized by paranoid ideation and auditory hallucinations. During the withdrawal phase, dysphoria can be so profound that some stimulant users present to emergency departments with suicidal ideation. In the case described next, emergency medical services were activated for a patient expressing homicidal ideation while intoxicated on methamphetamine.

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## Clinical Case

Simon is a 30-year-old man who has sex with men and has no prior psychiatric history. Emergency medical services transported Simon from his home to the emergency department after his roommate called 911 to report that Simon was making homicidal comments.

Upon entering the patient's room in the emergency department, Simon is observed to be talking to himself. On interview, the patient describes a scheme whereby his neighbor has hacked his webcam to intercept private masturbation videos he shares on a group sex website. Simon says there is evidence to support the notion that he's been hacked. For example, he notices delays when he livestreams his videos. Sometimes, he says, the videos fail to stream altogether. He reports that his neighbor is using a "data beam" she has aimed through his window into his apartment in order to intercept his videos. The patient reports hearing his neighbor speaking to him at the time of the interview.

Collateral is obtained from the roommate who called 911. The roommate says that the patient has been fixated on a window in the patient's room at home. The roommate recalls that Simon first put up tin foil to cover the window for no apparent reason. He then moved a heavy bookshelf in front of the window to block the window altogether. Asked what happened that the roommate decided to call 911, the roommate says the patient started repeating "I'm going to kill her" and was pacing anxiously in their small apartment. The roommate states that the patient in recent weeks has been smoking increasing amounts of "tina," not sleeping, and hardly eating.

On mental status exam, the patient is malnourished, and his hair is unkempt. Thought content is notable for delusions of persecution. Perceptual disturbances are

present, notably auditory hallucinations. The patient's speech is rapid but interruptible, and his thought process is linear. He is alert and grossly oriented. On workup, labs and electrocardiogram (EKG) are unremarkable. Simon's urine toxicology is positive for methamphetamine when the results came back a short time later.

The treating physician suspects a stimulant-related disorder based on the presenting history and objective findings. Given the severity of Simon's psychosis, Simon is admitted to the inpatient psychiatric service. Provided below is additional discussion about Simon's case and treatment.

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## Discussion

Simon is having auditory hallucinations and delusions of persecution in the setting of increased use of methamphetamine. His psychosis is most likely substance-induced. Also on the differential is a psychotic disorder such as schizophrenia. Psychosis in the setting of stimulant abuse can present a diagnostic challenge; stimulant-induced psychosis is sometimes misdiagnosed as schizophrenia [7]. Diagnostic ambiguity can be compounded by the fact that some individuals with chronic psychotic disorders also have stimulant use disorders. In this case, however, schizophrenia is less likely than methamphetamine-induced psychosis because of the relatively acute onset of symptoms in a patient with no known prior history of psychotic symptoms. Additional features of the case making schizophrenia less likely are the patient's linear thought process and the absence of negative symptoms.

Episodes of methamphetamine-induced psychosis typically are short-lived, although for some, episodes have been known to last six months or longer [8]. Even though they were not present in Simon's presentation, tactile hallucinations are common in stimulant-induced psychosis, especially formication (the sensation that insects are crawling under or on one's skin). When patients present in the intoxication phase, stimulant users typically have intact orientation.

Workup should include urine toxicology to evaluate for other potential substances of abuse. Labs should be ordered to rule out possible medical explanations for the patient's presentation, such as hyperthyroidism or hypoglycemia. Workup should also include EKG due to risk for cardiac arrhythmias. Physical exam should include evaluation of injection sites for signs of infection if patients are using intravenously.

Aside from methamphetamine-induced psychosis, the patient also meets criteria for methamphetamine use disorder based on additional history gathered from the patient during his hospitalization. For example, Simon later reported problematic use of methamphetamine for the previous two years. His problematic use had been marked by an inability to cut back on his use of methamphetamine, having cravings to use methamphetamine, losing two jobs in the catering industry due to his methamphetamine use, and experiencing both tolerance and withdrawal. He also admitted that his use in recent months had escalated from smoking methamphetamine to injecting it and to using more than he had intended.

**Table 9.1** Stimulants and their street names, routes of administration, and effects of intoxication and withdrawal

Substance	Street names	Routes of administration	Intoxication	Withdrawal
Cocaine	Coke, snow, blow	Intranasal, smoking, injection, suppository	Euphoria, increased energy, heightened alertness, increased sociability, decreased need for sleep, poor appetite. The intoxication phase can also	Dysphoria, anhedonia, fatigue, poor concentration, hypersomnolence, increased dreaming, increased appetite, arthralgias, chills, tremors, and involuntary motor movements
Methamphetamine	Crystal, tina, ice, speed	Oral, intranasal, smoking, injection	include unwanted effects such as anxiety, irritability, hypervigilance, suspiciousness, grandiosity, stereotyped behaviors, delusions, and hallucinations	
Amphetamine	Addys, smart pills	Oral, intranasal		
Synthetic cathinones	Bath salts, cloud nine, vanilla sky	Oral, intranasal, smoking, injecting		

The substance of methamphetamine itself can take on the physical appearance of shards of glass. Hence, it is commonly referred to as crystal meth. It is also known on the street as “speed,” “ice,” “crank,” “glass,” or “tina.” Methamphetamine and other stimulants have sympathomimetic effects. The increase in catecholamine neurotransmitter activity has downstream physical effects, including tachycardia, tachypnea, hyperthermia, hypertension, and anorexia. Psychiatrically, patients can experience anxiety, insomnia, or, as seen in Simon’s case, psychosis. Withdrawal from stimulants can include dysphoria, increased appetite, and hypersomnia. See Table 9.1.

In light of the struggles he has been experiencing personally and professionally now culminating in a hospitalization for psychosis, Simon could benefit from a number of available pharmacologic and nonpharmacologic treatment options.

## Treatment

While on the inpatient unit, Simon was started on risperidone, and the dose was titrated to 2 mg at nighttime. Simon’s symptoms of psychosis resolved quickly. Because of some evidence demonstrating that mirtazapine can be helpful in patients with methamphetamine use disorder, the patient was started on mirtazapine on an off-label basis and titrated to a nighttime dose of 30 mg. The patient reported tolerating both risperidone and mirtazapine well. Inpatient treatment lasted for six days. The patient’s social worker lined up an intake appointment for the patient at the treating hospital’s affiliated chemical dependency outpatient clinic. Unfortunately, he did not present for that appointment. When contacted by telephone for

post-hospitalization tracking, the patient stated he was no longer taking either the risperidone or the mirtazapine. He said he had returned to using methamphetamine, albeit reportedly in doses smaller than he had previously been using. He declined re-referral to outpatient substance treatment.

When treating patients with stimulant-related disorders, it is important to identify goals of treatment. Reduction or elimination of psychotic symptoms, return to school or re-entry into the workforce, maintaining abstinence from any stimulant use, and merely cutting back on stimulant use are goals worth discussing with patients.

In Simon's case, had he followed up with outpatient care, the treating psychiatrist would have needed to talk to him about the use of the antipsychotic. Long-term treatment with an antipsychotic is not required in cases of methamphetamine-induced psychosis if the symptoms of psychosis remit. An antipsychotic should only be prescribed to a patient with methamphetamine-induced psychosis who is still experiencing psychosis or who has had less than 3–6 months of stability on the antipsychotic. If the patient is psychiatrically stable after six months of use of an antipsychotic, the psychiatrist should consider tapering off the antipsychotic with continued close monitoring of the patient. Long-term treatment with an antipsychotic in resolved methamphetamine-induced psychosis is not indicated.

Unlike tobacco, opioid, and alcohol use disorders for which treatment options include FDA-approved medications, there is no FDA-approved medication for treatment of stimulant-related disorders. Simon was started on mirtazapine on an off-label basis. The rationale for prescribing mirtazapine was based on a study showing that men who have sex with men (MSM) prescribed mirtazapine had decreased use of methamphetamine [9]. The number needed to treat was 3.1. An expanded replication trial showed that the addition of mirtazapine in methamphetamine users reduced methamphetamine use as well as some human immunodeficiency virus (HIV) risk [10]. Another study has shown that more patients with methamphetamine use disorder responded to the combination of extended-release injectable naltrexone plus oral extended-release bupropion than those given placebo [11]. The number needed to treat was nine. Regarding cocaine use disorder research, the combination of extended release mixed amphetamine salts and topiramate has been found to be efficacious in promoting abstinence among adults with cocaine use disorder [12].

In the absence of an FDA-approved medication for stimulant-related disorders, psychotherapeutic approaches are critical. Several psychotherapeutic modalities have demonstrated efficacy. Drug counseling consists of individual and group sessions that center around topics of education and recovery. Drug counseling has demonstrated efficacy in reducing cocaine use among people with cocaine use disorder [13]. Cognitive behavioral therapy (CBT) has been shown to be efficacious in patients with cocaine use disorder [14] and methamphetamine use disorder [15]. CBT can be used to build skills helpful in maintaining abstinence [16]. See Table 9.2 for a sample of coping skills useful in the management of cravings for substances. Because of the link between stimulant-related disorders and high-risk sexual

**Table 9.2** A sample of coping skills useful in the management of cravings for substances

Skill	Comment
Urge surfing [22]	Cravings peak and then pass. Patients practice imagining themselves surfing on a large wave
Distraction [23]	Patients identify activities (especially physical activities) to engage in to distract them from intense urges to use
Recall of negative consequences [23]	Patients practice asking themselves, “How do I feel the day after using?” “What effect does using have on my relationships?”
Talking about craving [23]	Sharing the burden of cravings with a confidant or sponsor can offer relief. Patients can call an anonymous helpline (1-800-622-HELP) if a supportive contact is not available
Using self-talk [23]	Using positive rather than negative self-talk to challenge automatic thoughts about cravings and the perceived urgency to use
Normalize [23]	Patients practice recognizing that cravings are uncomfortable, expected, and can be experienced without resorting to use

**Table 9.3** Motivational interviewing [24] concepts and examples of questions

Concept	Examples of possible questions
Open-ended questions	“Tell me about your use of crystal meth.” “What are the benefits of using cocaine?”
Affirmations	“I see how hard you’re working at cutting back.” “You’re demonstrating good insight about your triggers to use.”
Reflections	“You sense there may be a connection between your moods and your use of cocaine.” “You’ve noticed more conflict with your partner when you exceed the prescribed dose of your stimulant medication.”
Summary statements	“Let me make sure I understand. You just explained how...”

behavior in MSM, some treatment programs include a concurrent focus on addressing high-risk sexual behaviors.

Other interventions include contingency management and aerobic exercise. Contingency management has demonstrated efficacy among patients with stimulant-related disorders in maintaining abstinence from stimulants [17]. Contingency management is a behavioral intervention used to augment other psychotherapeutic interventions. It relies on rewards to incentivize attainment of treatment goals. Voucher reinforcement and intermittent prize reinforcement are two strategies used in contingency management. Data also support implementing a program of aerobic exercise in patients with methamphetamine use disorder [18].

Employment of the tenets of motivational interviewing when speaking to patients with stimulant-related disorders is helpful. Maintenance of a non-judgmental stance with patients who abuse stimulants can build an alliance and foster openness. A strong alliance and openness may be features of treatment especially important to patients who experience shame or face stigma. When gathering a history, it can be helpful to normalize behaviors. For example, you might try asking the following, “Some people enjoy crystal meth because it is known to enhance sexual experiences.

I am curious to understand the ways crystal meth affects your sex life.” Also ask about other substances with which stimulant users may be inclined to experiment or abuse, including gamma-hydroxybutyrate (GHB), 3,4-methylenedioxymethamphetamine (MDMA), and ketamine. Use the principles of motivational interviewing. See Table 9.3 for motivational interviewing concepts and examples.

Harm reduction is an important strategy to employ in patients with stimulant-related disorders for at least two reasons. First, relapse is common. In the case of methamphetamine use disorder, the relapse rate is 61% within the first 12 months [19]. The second reason that harm reduction is important in stimulant-related disorders is that stimulants in high doses can be cardiotoxic. Harm reduction can help to mitigate risks from relapse. In keeping with a harm-reduction approach, try to ask patients presenting with stimulant-related disorders about sex work, condomless sex, routine screening for sexually transmitted illnesses (STIs), and pre-exposure prophylaxis (PrEP) to decrease the risk for HIV. Patients should be referred for STI screening along with screening for PrEP (or post-exposure prophylaxis, if indicated). Speedballing, the practice of combining a stimulant with an opioid, puts patients with stimulant-related disorders at risk for opioid overdoses. For this reason, it is appropriate to educate patients with stimulant-related disorders about the use of naloxone and to prescribe naloxone as a harm-reduction measure.

Some patients diagnosed with stimulant-related disorders suffer from comorbid psychiatric illness. For example, among patients with methamphetamine use disorder, 16% have a comorbid mood disorder and 7% have a comorbid anxiety disorder [20]. A tenet of treatment of stimulant-related disorders – and of substance use disorders more broadly – is to optimize treatment of any comorbid psychiatric disorders. Providers should also be careful to consider the role of early-life trauma. Early-life trauma has been shown to affect treatment success in methamphetamine use disorder [21].

Finally, support services are available. The Substance Abuse and Mental Health Services Administration (SAMHSA) operates a national helpline for people interested in referrals for substance treatment. The number is 1-800-662-HELP. Crystal Meth Anonymous is a 12-step recovery program. It runs a 24-hour helpline at 1-855-Meth-Free (1-855-638-4373). The organization’s website (<https://www.crysmeth.org/>) has a map feature to help patients find local meetings. Cocaine Anonymous is another option for patients with stimulant-related disorders.

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## Conclusion

The substances of abuse in stimulant-related disorders include cocaine, methamphetamine, amphetamines, and synthetic cathinones. Mental health workers aware of patients abusing stimulants should assess whether patients meet criteria for a stimulant-related disorder and screen for abuse of other substances. Although there is no FDA-approved medication for stimulant-related disorders, there is some evidence to support the use of certain medications and of psychotherapeutic interventions. Relapse rates are high.

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## Key Points

- Motivational interviewing is a psychotherapeutic technique that can be used to target ambivalence and assess readiness for change in patients with stimulant-related disorders.
- Be sure to screen for use of other substances in patients who abuse stimulants.
- Use harm-reduction techniques.
- Optimize treatment of psychiatric comorbidities.

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