

High Dose Stimulant Substitution for the Treatment of Cocaine and Crystal Meth Use Disorders

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Introduction

Treatment of substance use disorder has advanced substantially in the last few decades. Psychosocial interventions such as motivational enhancement treatment, CBT for relapse prevention, and contingency management have been developed and are now widely utilized. A number of effective medications have been approved and implemented for the treatment of alcohol, tobacco, and opioid use disorders. The biggest gap, specifically in the pharmacological treatment of addictive disorders, is the lack of medications to treat stimulant use disorders such as cocaine and methamphetamine use disorders.

The most efficacious pharmacological treatment in addiction so far has been substitution therapy for individuals suffering from dependence on heroin and other opioids. The two main medications – Methadone and Buprenorphine – are long acting opioid agonists, or partial agonists, which effectively reduce the use of heroin and other short acting opioids. They have a strong impact on the health and quality of life of the patients. Substitution treatment not only reduces the compulsive use of these addictive substances, but also diminishes the associated negative medical and social concomitants, such as infections, a disruptive life style, and involvement in criminal activities. Substitution or agonist treatment reduces patients' need to chase the abused drugs and eases the access to psychosocial intervention and social integration.

Dual process theory may be a simple heuristically helpful approach to discuss decision-making aspects of addiction. Dual process theory explains decision-making as interplay of two components of the mind: the “intuitive”, reflexive, non-conscious component and the “rational”, reflective, conscious component. Medication helps to weaken or reduce the reflexive, often unconscious “intuitive” motivation to approach and use the substance of abuse. On the other hand, psychotherapeutic approaches try to strengthen the reflective component, improve rational cognitive control, and develop conscious strategies to avoid relapse. This may be an oversimplification, but it delineates the complementary aspects of combining these approaches.

Numerous medications have been tested to treat stimulant dependence (cocaine and methamphetamine). So far the results have been less than encouraging. Recently, [1] a study by Levin et al. (2015) reported that extended-release mixed amphetamine salts successfully reduced relapse to cocaine in individuals with Cocaine Use Disorder and Comorbid Adult Attention-Deficit/Hyperactivity Disorder. They found higher doses to be associated with better outcomes. Given that stimulants are used to treat ADHD, the long slow release agonists may both reduce cravings for stimulants (weakening the reflexive urge) and improve executive functioning and reflective cognitive control. The results are thus intuitively appealing. But this recent positive study outcome follows a long list of clinical trials with inconsistent, mainly-negative findings.

The key result of the study by Levin appears to be the dose dependent reduction in relapses. Higher doses of slow release amphetamine treatment led to better outcomes. Higher doses of amphetamine and Ritalin clinical in trials have generally, though not

consistently, lead to better outcomes [2]. Thus, it seems pertinent to further explore the possibility of treating stimulant dependence with higher doses of slow release stimulants. Amphetamine and Ritalin were introduced to treat ADHD, originally in children. Because of this, the doses used for ADHD treatment may not be the optimal dose to treat cocaine and methamphetamine use disorder. In addition, higher doses of stimulants have seemed to be more successful in the treatment of ADHD in adults [3].

Clinicians regularly report using higher doses in the treatment of stimulant dependence. [4] Castaneda et al. used up to 220 mg to treat cocaine dependence. There are case studies indicating the successful use of substantially higher doses, needed by some individuals, for the successful treatment of ADHD. But systematic studies on adapting doses to individuals needs are currently lacking. The main concerns are potential side effects, which need to be carefully studied. Pawluk et al. [5] reported limited side effects on individuals treated with 198.2 ± 127.9 mg Ritalin for 14.2 ± 6.2 years. Doses had generally been slowly increased within the first year. This was a very selective sample of individuals treated for narcolepsy.

A major emphasis in the early phases of methadone treatment was the need to treat with adequate doses. The tendency was to treat with lower doses, resulting in less effective treatments. Individuals with a history of cocaine use or use of other stimulants may need higher doses for successful treatment. We need carefully designed studies that further explore this potential medical approach; to test this intuitive and surprisingly little-explored course of treatment. Studies would have to closely monitor patients, weighing the damage done by untreated stimulant dependence and potential side effects of a high dose treatment. It appears worthy – if not crucial – to test the application of higher doses of slow release stimulants to treat individuals with stimulant use disorder, specifically those suffering from severe stimulant disorder such as crack cocaine and crystal-meth use disorder.

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Received August 28, 2015; Accepted August 28, 2015; Published August 31, 2015

Citation: Schütz CG (2015) High Dose Stimulant Substitution for the Treatment of Cocaine and Crystal Meth Use Disorders. *J Addict Res Ther* 6: e131. doi: [10.4172/2155-6105.1000e131](http://dx.doi.org/10.4172/2155-6105.1000e131)

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Citation: Schütz CG (2015) High Dose Stimulant Substitution for the Treatment of Cocaine and Crystal Meth Use Disorders. J Addict Res Ther 6: e131. doi: [10.4172/2155-6105.1000e131](https://doi.org/10.4172/2155-6105.1000e131)

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