ADHD and Substance Use Disorders
John Roberts, MD

**Adult ADHD Prevalence**
- US Current prevalence - 2.5-4.4% (Kessler, et al., 2006, NCSR)/5% (Barkley 2012)
- Lifetime prevalence in SUD – 23.1% (van Emmens et al., 2012)
- Adults with ADHD more likely than general population to have SUD, OR=1.5-7.9 (Kessler, Barkley, 2006)
- 33% of Adult ADHD patients have AUD, 20% have SUD (Waid, 1998)
- Hx of childhood ADHD found in 17-50% of those with SUD (Waid, 1998)
- Adult ADHD patients have higher rates of mood disorder, anxiety disorders, intermittent explosive disorder, antisocial personality disorder

**Childhood ADHD**
- Childhood prevalence 5-7%
- 40-60% continue to have significant ADHD-related problems in adulthood

**Impairments**
- Higher rates of:
  - Occupational difficulties
  - Criminal behavior
  - Traffic accidents and citations
  - Divorce
  - Bankruptcy
  - Mortality

**ADHD and Relationships**
- Marital discord related to:
  - Poor listening skills
  - Distractibility
  - Emotional outbursts
  - Isolation and hyperfocus
  - Forgetfulness
  - Disorganization/clutter
  - Impulsive spending/difficulty with finances

**Pathogenesis**
- Brain imaging indicates dysfunction in right fronto-subcortical and parietal circuits
- Most prominently in prefrontal cortex
- Smaller volumes in frontal cortex, cerebellum and subcortical structures
- Hypoactivity of dopamine and norepinephrine in these circuits underlies the brain dysfunction
Genetics
- Risk of ADHD in parents and siblings of children with ADHD increased 2-8 times
- Heritability estimated at 76%
- 10-35% of immediate family members of children with ADHD are likely to have ADHD
- If parent has ADHD, risk to the offspring is 57%

Is Adult ADHD a Distinct Disorder?
- Recent study suggests Adults presenting with ADHD may not have childhood-onset neurodevelopment disorder
- 1,037 people followed for 4 decades in New Zealand
- Childhood prevalence-6%
- Adult prevalence-3% but only 3 of these had childhood ADHD diagnosis

Adult ADD Distinct Disorder?
- Adults showed almost none of hallmark deficiencies found in childhood
- Brains worked fine when taking IQ or working memory tests
- More trouble with forgetfulness and word finding
- Adults had much higher rates of SUD(48%) than those diagnosed as children

DSM 5 Diagnosis
- In making the diagnosis, children still should have six or more symptoms of the disorder. In people 17 and older the DSM-5 states they should have at least five symptoms.
- The criteria of symptoms for a diagnosis of ADHD:
  INATTENTIVE PRESENTATION
  - Fails to give close attention to details or makes careless mistakes.
  - Has difficulty sustaining attention.
  - Does not appear to listen.
  - Struggles to follow through on instructions.
  - Has difficulty with organization.
  - Avoids or dislikes tasks requiring a lot of thinking.
  - Loses things.
  - Is easily distracted.
  - Is forgetful in daily activities.

Hyperactive-impulsive presentation:
- Fidgets with hands or feet or squirms in chair.
- Has difficulty remaining seated.
- Runs about or climbs excessively in children; extreme restlessness in adults.
- Difficulty engaging in activities quietly.
- Acts as if driven by a motor; adults will often feel inside like they were driven by a motor.
- Talks excessively.
- Blurs out answers before questions have been completed.
- Difficulty waiting or taking turns.
- Interrupts or intrudes upon others.

Combined inattentive & hyperactive-impulsive presentation:
Several symptoms present before age 12
Several impairments are present in 2 or more settings
Sx's interfere with functioning
Sx's do not occur during course of psychotic disorder and not better accounted for by another mental disorder (e.g., mood, anxiety, dissociative or personality disorder)

Specify
- Combined presentation
- Predominately inattentive presentation
- Predominately hyperactive-impulsive presentation
- Partial remission
- Mild
- Moderate
- Severe

Proposed Diagnostic criteria for ADHD in Adults
- 6 of 9 sx's or 4 of the first 7 for 6 months
- 1. Often easily distracted by extraneous stimuli.
- 2. Often make decisions impulsively.
- 3. Often have difficulty stopping activities when they should do so.
- 4. Often start projects without reading or listening to directions
- 5. Often show poor follow through on promises or commitments made to others.
- 6. Often have trouble doing things in their proper order or sequence
- 7. More likely to drive faster or have difficulty in leisure activities or doing fun things quietly
- 8. Often has difficulty sustaining attention in tasks and leisure activities.
- 9. Often has difficulty organizing tasks and activities

Inattention Examples
- Easily distracted by sounds, movements
- Problems resuming tasks after distraction
- Poor concentration in conversations, meetings
- Difficulty getting started on and following through on tasks, procrastination
- Forgetfulness, lose items, late for deadlines
- Difficulties with focus and comprehension when reading

- Daydreamer, gets lost in thought
- Disorganization
- Run out of steam, low attention vigilance
- Require longer than average to complete projects
- Underperformance relative to abilities
Hyperactive-Impulsive Examples
- Fidgety, frequent shifting
- Tapping fingers, pen wagging foot, playing with items
- Discomfort with sedentary, confining tasks
- Mental restlessness, juggling several ideas but not following through on any
- Starting projects but not finishing them
- Saying things without thinking or inappropriate to setting, impulsive

Sluggish Cognitive Tempo
- Lethargic, slow moving
- Underactive, low energy
- Difficulty getting engaged in a setting “mind wandering,” “daydreaming”
- Problems staying awake, alert if bored
- Slow mental processing
- Easily confused or mentally overwhelmed
- Likely to “shut down”
- Anxiety

Executive Function (EF)
- “Those self-directed actions needed to choose goals and to create, enact and sustain actions towards those goals”
- Difficulty with self-management, including organization, planning, initiating and completing tasks on a timely basis
- Results in reduced productivity, inefficiency, missed deadlines, poor planning, “careless errors” and losing and forgetting things as a result of disorganization

Executive function (EF)
- These difficulties contribute to failure to achieve goals, - personally, academically, and occupationally which can in turn lead to high rates of anxiety and depression
- ADHD now understood as neurodevelopmental disorder of EF and motivational deficits (Volkow et al., 2009)

Executive Function
- Regarded by many as the defining characteristic of ADHD in children and adults
- Response inhibition
- Working memory
- Set shifting
- Planning and executing for the future: temporal discounting
EF Neuropsychological Testing vs. Rating Scales

• Question whether these tests capture the scope of EF in ADHD and other disorders
• Neuropsychological testing identified only 14% of 194 adults with ADHD
• Few false positives for boys but higher rates of false negative in identifying ADHD
• Only 33% of 259 children with ADHD had EF deficits based on neuropsychological test battery. Biederman and colleagues 2004 & 2008

Self-Rating Scales of EF

• Brown Attention Deficit Disorder Scale (BADDS; Brown, 1996)
• Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005)
• Barkley Deficits in Executive Functioning Scale – BEDEFS (Barkley, 2011)

NEuropsychological testing

• Not appropriate to rule in or rule out a diagnosis of ADHD
• May be useful in for assessing cognitive strengths, reading and learning deficits for educational and occupational purposes
• May be required to document need for academic accommodations
• Barkley 2014

BEDEFS (Barkley, 2011)

• 89 item
• Self-Management to Time-prepared on time for tasks, time estimation, planning
• Self-Organization/Problem Solving
• Self-Restraint
• Self-Motivation
• Self-Regulation of Emotions
• (Barkley, 2011)

Brown Attention Deficit Disorder Scale (BADDS; Brown, 1996)

• 40 items divided into 5 subscales
• Activation-initiation of task, time estimation
• Attention-focused, sustained and shifting
• Memory-working and short term
• Effort-regulation of alertness, sustaining effort
• Affect-modulating emotions
• 142 adults- significant difference between controls and ADHD groups

EF Tests vs. EF Scales

• EF scales accounted for > half of the variation in impairment
• EF Tests explained < 10%
• These two approaches are not measuring the same construct

(Toplak et al.; 2013)
Psychological Assessment Of Adults with ADHD

- Clinical interview - Family, Educational, Occupational, Social History
- Structured Diagnostic interview
- Review of clinical Inventories - past and current ADHD Sx checklist (self and other report)
- Adult ADHD inventories (self and other report)
- EF inventory (self and other report)
- Other mood, anxiety and psychiatric Sx inventories

ADULT ADHD Evaluation

- Screening – brief telephone screen to rule out contraindications
  - 18 item scale
  - First six items provide a reliable stand-alone screening measure - each item rated on 5-point Likert scale from 0 rarely to 4 very often
  - Total scores of 11 or more highly predict ADHD
  - < 11 raise question about motive

ADHD Symptom Checklists

- ADHD Rating Scale-IV
- Adult Self-Report Scale
- Barkley Adult ADHD Rating Scales-IV
- Wender Utah Rating Scale (for childhood symptoms)

Adult ADHD Inventories

- Brown Attentive-Deficit Disorder Scales - Adult Version
- Conners’ Adult ADHD Rating Scale

EF Inventories

- Barkley Deficits in Executive Functioning Scale (BEDEFS)
- Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A)

Functional Impairment Inventories

- Adult ADHD Quality of Life Scale
- Barkley Functional Impairment Scale
- Weiss Functional Impairment Scale
Comorbidity Inventories
- Beck Depression Inventory-II (BDI-II)
- Hamilton Depression Scale (HAM-D)
- Hamilton Anxiety Scale (HAM-A)
- Beck Anxiety Inventory (BAI)
- The Penn State Worry Questionnaire (PSWQ)
- Symptom Checklist -90–Revised (SCL-90-R)

Imaging or Laboratory Testing
- NEBA (Neuropsychiatric Interpretive Electroencephalograph Assessment Aid)
  - NEBA is a 15 minute test that integrates an EEG biomarker for ADHD into the clinical setting. NEBA can help the clinician verify when ADHD is present.
  - When applying NEBA, clinicians still conduct their regular evaluation. NEBA provides additional information by using EEG to separate ADHD patients into biomarker-based groups with clinical differences that allow validated recommendations to be offered to the clinicians. NEBA is the only ADHD biomarker that is FDA cleared, CE marked, Health Canada licensed, and USPTO patented.
- Neuroimaging
  - The neuroimaging technique that has aroused the most interest among those suspected of having ADD is SPECT. This 20-minute test measures blood flow within the brain; it shows which brain regions are metabolically active ("hot") and which are quiescent ("cold") when an individual completes various tasks.
  - Few ADD experts consider SPECT a particularly useful tool in diagnosing or treating ADD. The work of people like Dr. Amen, many experts say, has not been available for the scrutiny of the scientific community, and his findings haven’t been duplicated by the research of others - a basic criterion of scientific validity.

NEBA
- NEBA is the first of a new kind of medical device cleared by the FDA that uses brainwaves (EEG) to help clinicians more accurately diagnose ADHD in children and adolescents (ages 6 – 17.99 years). FDA created an entirely new category of medical device to regulate NEBA. These devices are called Neuropsychiatric Interpretive EEG-based Assessment Aids or NIEAs for short.

SPECT
- The procedure entails an injection of a radioactive isotope that is then picked up by the brain. This means exposure to a small amount of radiation - about the equivalent of an X ray. The patient lies motionless as a camera rotates around his head. Several scans may be required, at a cost that can top $1,000.
- Daniel Amen, MD – Amen Clinics (6 ADHD subtypes)
• American Psychiatric Association and the American Neurological Association maintain that information obtained through EEG isn’t reliable enough to detect the more subtle changes of psychiatric disorders. More generally, the American Academy of Pediatrics doesn’t recommend any lab tests for ADD - making specific reference to neuroimaging techniques, including SPECT, and qEEG. The American Academy of Child and Adolescent Psychiatry is similarly skeptical: ADD is “a clinical diagnosis,” and brain imaging and the like provide “insufficient data.”

What if Patient Does Not have ADHD
• 40% of referrals to an Adult ADHD were found NOT to met full DSM-IV criteria although all suspected they might have ADHD
• Explain many factors can contribute to inattention
• All inattention is not ADHD and ADHD is far more than being inattentive

Malingering
• Particularly relevant for high school and college students who are motivated to obtain academic accommodations or prescriptions for stimulants for performance, misuse and/or diversion
• 22% misrepresented symptoms or performance on cognitive testing
• 15% estimated baseline rate of malingering

Malingering
• Comprehensive assessment and multiple steps involved may protect against individuals looking for quick diagnosis
• More likely to seek out all-in-one appointments (PCP or psychiatrists)
• Excessive focus on and agitation about obtaining medications, especially at the start of the evaluation
• Circumventing typical assessment procedures

Malingering
• Easy to fake symptoms on ADHD scale but more difficult to give specific examples of functional impairment across time in a coherent fashion
• Corroborative information – report cards or observer reports
• Extreme exaggeration on behavior scales (> 2 standard deviations)
• Symptom validity tests (SVTs)

Differential Diagnosis
• GAD
• BPAD
• MDD
• ODD/ASP
• PAWS
• SUD/SIMD
**ADHD and SUD**

- Alcohol is most commonly abused substance followed by cannabis
- May self medicate with stimulants
- Poorer outcomes and greater risk for relapse
- Difficulty focusing in groups
- Disruptive
- Procrastinate or fail to complete assignments
- Emotional lability
- Forgetfulness/missed appointments

**Strategies for ADHD**

- Engagement- motivational techniques for invasive, talkative, hyperactive client
- Gentle redirection
- Increase use of visual aids- modalities other than auditory/verbal (diagrams, pictographs, videos)
- Structured and goal-directed sessions
- Avoid long verbal exchanges, extended group therapies, over stimulating environments

**Strategies for ADHD**

- Usual 3 hours, three times weekly in IOP's will be difficult for many with ADHD
- Frequent brief sessions preferable to a few long intense ones
- Standard Substance abuse treatment modalities such as AA meetings (60 minutes versus all day, videos vs. textbooks, short group check-ins
- Help with organization and set deadlines
- (Substance Abuse Treatment for Persons with COD, TIP 42)

**ADHD/SUD Workbooks**

- “The Twelve Steps- A Key To Living With Attention Deficit Disorder”
- Friends in Recovery/RPI Publishing, Inc. San Diego

**CBT**

- Integrated cognitive behavioral therapy for patients with Substance Use Disorder and Comorbid ADHD: (van-Emmerik-van Oortmerssen et al.)
- 2 case studies
- RCT in progress

**Neurofeedback (NF)**

- Based on findings of increased theta band activity and higher beta-to-theta ratio on EEG
- Early studies claimed as effective as medication and produced long lasting improvement in 80% of children (none used sham, placebo, comparison groups or blinded assessments)
- More recent better controlled studies have led to mixed results
Neurofeedback (NF) Review

- 4 studies that used sham or placebo and kept parents blinded and ¼ therapist blinded found improvement in both groups but no difference between groups (no treatment effect)
- No changes in in the EEG and no difference in neuropsychological testing
- The very mechanism by which NF is argued to work did not change
- (Loo and Makieg, 2012)

NF Review

- Strongly suggest improvement is non-specific (therapist contact, parental expectancy effects, participant motivation, etc.)
- 5 studies comparing NF to another active treatment found ADHD inattention significantly improved with each treatment rated by parents (one-tailed test biased to finding an effect)
- None found improvement in teacher rated Sx's and ¼ found no change in EF

NR Review

- “studies herein do not support NF treatment as a first-line, stand alone treatment for ADHD” (Loo and Makieg, 2012)
- Other reviews found similar conclusions (Moriyama et al, 2012) and Lofthouse et al, 2012)
- Recent sham-placebo treatment with blinded evaluations found significant improvement with no difference between groups (van Dongen-Boomsma et al, 2013)

CBT

- Objections:
  - Neurobiological disorder so nonmedical treatment won't work
  - Medications are already effective
  - ADHD in children with ADHD in the 1980's did not work well

CBT

- Behavioral Medicine Service at Massachusetts General Hospital (Boston, MA)
- Mount Sinai Adult ADHD Program at the Center of Excellence in ADHD and Related Disorders, Icahn School of Medicine at Mount Sinai (New York, NY)
- Penn Adult ADHD Treatment and Research Program (Philadelphia, PA)
CBT

- Group approach: Cognitive Behavioral Therapy for Adult ADHD (Solanto et al., 2008)
- Designed to help develop executive self-management skills
- Train clients in time management, organization and planning of long term projects
- Weekly 2 hour group sessions

CBT and Medication

- No head to head medication vs. CBT
- Whereas medication helps to control the core symptoms of distractibility, short attention span, and impulsivity, CBT is more effective at increasing the habits and skills needed for executive self-management, and may also serve to improve emotional and interpersonal self-regulation.

Adult ADHD Books

- Taking Charge of Adult ADHD (Barkley, 2011)
- Work, finances, relationships, organization, etc.
- ADD-Friendly Ways to Organize Your Life Paperback – November 7, 2002
  - by Judith Kolberg (Author), Kathleen Nadeau (Author)

- ADD-Friendly Ways to Organize Your Life
  - Also available in audio format
  - Authors: Judith Kolberg and Kathleen Nadeau
- Understand Your Brain, Get More Done: The ADHD Executive Functions Workbook
  - Author: Ari Tuckman
- The Disorganized Mind: Coaching Your ADHD Brain to Take Control of Your Time, Tasks, and Talents
  - Author: Nancy Ratey
- You Mean I’m Not Lazy, Stupid or Crazy!: The Classic Self-Help Book for Adults with Attention Deficit Disorder
  - Also available in audio format
  - Authors: Kate Kelly and Peggy Ramundo

CBT

CBT


Useful Apps for ADHD

- 1. Awesome Note
  - Awesome note is an all in one life organizer app designed to integrate a patient’s phone, calendar, and to do list in one place. For someone with adult ADHD, the app provides a snapshot of all activities in folders that can be customized as personal, work, travel, to do list, etc. This helps to ensure that all commitments are fully completed and work life balance is not disrupted. A folder can be password protected to store private information.
  - The contents of the app back up automatically to Google Drive or Evernote

- 2. 30/30
  - 30/30 is a time management app that can help patients finish a task or a project within an allotted time. A common struggle in adult ADHD is how to budget, pace, and manage time effectively. Once the allotted time for a task has been set (Eg. couple of hours), 30/30 takes over. The user sets up a list of tasks and a length of time for each of them. When the timer starts, it will tell the user when to move on to the next task. One can add a 5 or 10 minute mini-break to allow mental rest, check a text message, or score and return to finish remainder of the task when prompted

- 3. You Need A Budget (YNAB)
  - Financial Discipline maintaining a home budget, setting aside savings, and paying bills on time can be a challenging task for any adult. Adults with ADHD face these challenges and subsequent negative outcomes at a much higher rate due to symptoms of impulsivity, disorganization, procrastination, and inattentiveness
  - YNAB can be an invaluable tool that allows budget keeping, personal financial planning, and bill reminder all in one mobile app and desktop companion. The app is user friendly and takes a team approach by allowing a person to add his or her spouse in this important process. Practical tutorials are available for support. All relevant data is backed up in dropbox

- 4. Sleepio
  - Sleep difficulties are extremely common among adult ADHD individuals for several reasons. For one, there are changes in sleep architecture due to ADHD itself. In addition, medications, including Psychostimulants may have adverse effects.
  - Sleepio is a “virtual sleep therapist,” a 6week cognitive behavioral therapy based program. The app trains people to use techniques that address the cognitive factors associated with insomnia, such as the “racing mind,” and to overcome anxiety and other negative emotions that accompany the experience of being unable to sleep

- 5. Medisafe
  - Like other chronic conditions, adult ADHD is often accompanied by the challenge on the part of the patient to comply with treatment recommendations, such as medication adherence. Deficits in attention, disorganization, and procrastination all negatively impact quality of life. Missed doses and medication taken at incorrect times (especially in the case of a stimulant) can cause more harm than benefit.
  - Medisafe is a “virtual pill organizer” that is easy to use and has an attractive user interface. What sets this app apart from others?
  - MedFriend has a feature that allows family or friends to remind patients to take their medication on time
Useful Apps for ADHD

1. Awesome Note (bridworks.com; iOS; Free)
2. 30/30 (3030.binaryhammer.com; iOS; free)
3. You Need A Budget (YNAB) (youneedabudget.com; iOS, Android, PC; 30 day trial then one time $60)
4. Sleepio (sleepio.com; iOS, Android, PC; Free trial, Paid monthly plans)
5. Medisafe (medisafe.com; iOS, Android; Free)

- See more at: http://www.psychiatrictimes.com/adhd/5-useful-apps-adult-adhd#sthash.WFRZ4Luu.dpuf

Video games

- Project EVO
  - Train to ignore distractions and stay focused
  - Networks that control multitasking overlap networks that control working memory, and attention span

Psychopharmacology

- Stimulants
- Strattera (Atomoxetine)
- Wellbutrin (buproprion)
- Desipramine
- SNRI’s
- Tenex (guafenasine)/ Intunive
- Clonidine/Kapvay
- Nuvigil/Provigil

Strattera

- Atomoxetine – norepinephrine reuptake inhibitor increases norepinephrine and Dopamine
- FDA approved
- No abuse potential
- Delayed onset
- Meta-analysis of 12 clinical studies found it to be modestly more effective than placebo in reducing inattention and hyperactivity

- Greater reduction of symptoms than placebo (30 vs. 20%)
- Expensive
- Side effects – N/V, dry mouth, decreased appetite, insomnia, sexual side effects, sweating
- May help anxiety
- Dose – 80-100mg

Wellbutrin

- Antidepressant that increases norepinephrine and dopamine
- No direct comparisons to stimulants
- Low abuse potential but multiple case reports of abuse
- 53 vs. 31 percent experienced a 30% decrease in symptoms
- 1st line if depression or nicotine dependence
TCA’s
- Desipramine
- Higher proportion of treatment responders (68 vs. 0%)
- Dose 100-300mg q day
- Lethal in overdose
- Helpful with depression and anxiety

Alpha-2 agonists
- Guanfacine (Tenex/Intuniv) 1-2mg BID -TID
- Clonidine (Kapvay) .1mg -.2mg TID
- More helpful with impulsive, aggressive boys
- May help with anxiety/agitation
- Sedation
- Hypotension
- 1-2 week onset
- Considered 4th line treatment

Other Options Lacking Robust Evidence
- Venlafaxine (Effexor)
- SSRI’s
- MAOI’s
- Selegeline (l-deprenyl)
- Modafonil (Provigil)/ Armodafonil(Nuvigil)
- Cholinesterase inhibitors (Aricept)
- Dopamine agonists (Amantadine)
- Micronutrients

Medications used in ADHD
- Stimulants
- Atomoxetine (Strattera) 30 Vs. 20%
- Bupropione- mixed results
- Desipramine/SNRI’s
- Modafinil
- Clonidine/Guanfacine
- Dopamine agonists
- Donepezil (Aricept)
- Selegeline/Pargyline

Stimulants show greater effect size than non-stimulants

Stimulants
**Stimulants**

- Methylphenidate (Ritalin) improved ADHD and decreased cocaine use.
- Methylphenidate improved ADHD, but showed no change in drug use.
- SR methylphenidate showed improvement in ADHD but no change from placebo.
- Decreased probability for (+) cocaine UDS responders had a better outcome than non-responders.


- Extended-Release Mixed Amphetamine Salts vs Placebo for Comorbid Adult Attention-Deficit/Hyperactivity Disorder and Cocaine Use Disorder
- A Randomized Clinical Trial
- doi: 10.1001/jamapsychiatry.2015.41
- Levine and Mariani et al., 2015

- More patients achieved at least a 30% reduction in ADHD symptom severity in the medication groups (60 mg: 30 of 40 participants [75.0%]; odds ratio [OR] = 5.23, 95% CI, 1.98–13.80; P < .001) and 80 mg: 25 of 43 participants [58.1%]; OR = 2.27, 95% CI, 0.94–5.49; P = .07) compared with placebo (17 of 43 participants [39.5%]). The odds of a cocaine-negative week were higher in the 80-mg group (OR = 5.46; 95% CI, 2.25–13.27; P < .001) and 60-mg group (OR = 2.92; 95% CI, 1.15–7.42; P = .05) compared with placebo. Rates of continuous abstinence in the last 3 weeks were greater for the medication groups than the placebo group: 30.2% for the 80-mg group (OR = 11.87; 95% CI, 2.25–62.62; P = .004) and 17.5% for the 60-mg group (OR = 5.85; 95% CI, 1.04–33.04; P = .04) vs 7.0% for placebo.

- In summary, this trial finds that (1) patients with ADHD and CUD benefit from treatment with extended-release mixed amphetamine salts combined with CBT; (2) exposure to extended-release mixed amphetamine salts produces a reduction in cocaine use; and (3) extended-release mixed amphetamine salts can be given safely to patients with CUD. Often, stimulants are withheld from individuals with co-occurring substance use disorders because of concern of diversion and clinical worsening. Instead, this study found the opposite—patients benefited from treatment. Thus, under closely monitored conditions, pharmacotherapy should be promoted, not barred.

- Use of extended-release psychostimulants to manage ADHD is not contraindicated in patients with a past history of stimulant abuse (eg, cocaine, methamphetamine, MDMA) as long as they are 4 months stimulant-free. Stimulants may improve retention in addiction treatment, and in some cases, may decrease harm from substance use.

- Similar to other clinical trials of extended-release formulations of stimulants, there was no reported medication diversion or abuse.
- A recent laboratory study of individuals who regularly used cocaine reported dose-related increases of liking for higher cocaine doses, but low and high doses of amphetamine produced only minimal drug liking. This critical finding suggests that oral amphetamine doses in the therapeutic range have lower reinforcing efficacy in individuals with stimulant use disorders, plausibly due to history, tolerance, or lower abuse potential of oral doses.

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**Stimulant Replacement Therapy**

- Agonist-like pharmacotherapy for stimulant dependence: preclinical, human laboratory, and clinical studies.
- Herin DV, Rush CR, Grabowski J.

**Stimulants**

- Use with caution (delay for 4 months)
- Use delayed release formulas
- Lisdexamphetamine (Vyanse)
- Adderall XR
- Concerta
- Daytra
- No abuse of stimulants or increase cravings for cocaine were reported

**Summary**

- High rate of ADHD in SUD
- Neuropsychological testing not mandatory
- CBT and 12 steps are effective
- Mixed results regarding Imaging and neurofeedback
- Non-stimulants are first line
- Stimulants not contraindicated

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