Management of ADHD

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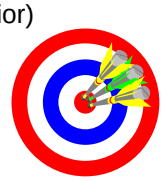
Treatment Package

- I. Evaluation (Diagnosis)
- II. Education (Counseling)
- III. Medication
- IV. Modification (behavior)
- V. Accommodations
  - at home
  - in school
  - in the community



Empirically Proven Treatments

- Psychopharmacology
  - Effect sizes: AMP = 1.0+, MPH = .75+
- Parent Education About ADHD
- Parent Training in Child Management
  - Effect sizes: .26 - .40
- Family Therapy for Teens: Problem-Solving, Communication Training
  - 35% response rate in teens with ADHD/ODD
- Regular Physical Exercise[1]

1. Allison, D. B., Faith, M. S., & Franklin, R. D. (1995). (Meta-analysis) *Clinical Psychology: Science and Practice, 2*, 279-304.

Empirically Proven Treatment

- Teacher Education About ADHD
- Teacher Training in Classroom Behavior Management and Accommodations
  - Effect sizes: .34 - .75 (varies by intensity)
- Special Education Services (IDEA, 504)
- Residential Treatment (5-8%)
- Parent/Family Services (25-35%)
- Parent Support Groups
- Cognitive behavioral EF training of adults
  Safren (Harvard), Ramsay & Rostain (UPenn), Solanto (Mt. Sinai, NYC)

Experimental Treatments

- EEG Biofeedback/Neurofeedback
  - Issues – Inconsistent Results, High Cost, Uncertain durability of effects after treatment termination
  - Is EEG feedback the mediator of effects?
- Training working memory (CogMed)
  - Results are mixed. Effects on other WM tests are evident; effects on parent ratings but not on teacher ratings of school behavior – no surprise as parents do the treatment
  - Just 10-40% respond, improvement is modest
  - Incentives for remembering and meds do just as well or better, especially when combined
  - Other cheaper approaches: Nintendo with Brain Age game, Lumosity.com, mybraintrainer.com, e-mindfitness.com, happyneuron.com, positscience.com
- Computer Attention Training and Computer Assisted Instruction (reading, math)
  - Results are mixed. More effects on other tests and parent ratings. Inconsistent effects on teacher ratings

More experimental programs

- Time management and organization training for school (Abikoff, NYU Medical School) – Effects no better than traditional behavior management
- Training parents as friendship coaches of ADHD children's social skills – several positive studies

Mikami et al. (2010). *Journal of , Abnormal Child Psychology, 38*, 737-749

- Omega-3/-6 fatty acids**
  - Very few studies, results are mixed
  - Long chain versions may be more helpful
  - But just 25% of kids showed improvement of 25% or more in symptoms in Swedish study; mostly inattentive type
  - Effect sizes are small (.25) but occasionally moderate (.56) when significant results were evident
  - Studies typically find no effect on teacher ratings

**Johnson, M. et al. (2009). *Journal of Attention Disorders, 12*, 394-401.
**Transler, C. et al. (2010). *Journal of Attention Disorders, 14(3)*, 232-246.
**Bloch, M. H. & Qawasmi, A. (2011). *Journal of the American Academy of Child and Adolescent Psychiatry, 50*(10), 991-1000. (Meta-analysis)

Weak Effectiveness

- Elimination Diets – colorings, preservatives, or other additives, etc.
  - Mean effect size change = .20-.29
  - Just 8% of ADHD is due to additives
  - INCA study in Netherlands (Pelsser et al., 2011) – highly positive results (effect size 2.0) with 59-66% responders but
    - study lacked a placebo control and blinding of parents and teachers to treatments
    - Investigator not blind to treatment and gave advice to parents throughout treatment with restricted diet
    - Parents had to be motivated to do 5 week elimination diet
    - No evidence that allergic reactions (blood IgG and IgE markers) actually mediated results
    - Effect size is 2-4x that of medications, 8 times that of parent training, 3-5x that of classroom management – too large to be believable

Unproven or Disproven Treatments

- Megavitamins, Anti-oxidants, Trace Elements and Minerals*
  - No compelling proof for most supplement; others have been disproved
- Sensory Integration Training (disproved)**
- Chiropractic Skull Manipulation (bad theory, no proof)
- Play Therapy, Psycho-therapy (disproved)
- Self-Control (Cognitive) Training in children
  - Disproved for children; works for adults on meds
- Social Skills Therapies (if done in clinics)
  - Better for InattentiveType or SCT Cases
  - May work if done by parents and teachers

*Chann, E., Rappaport, L., & Kemper, K. J. (2003). Complementary and alternative therapies in childhood attention and hyperactivity problems. *Journal of Developmental and Behavioral Pediatrics, 24*, 4-8.

**Vargas, S., & Camilli, G. (1999). A meta-analysis of research on sensory-integration treatment. *Journal of Occupational Therapy, 53*, 189-198.

Counseling Parents

Counseling Parents

- Review ADHD: Nature, Causes, Course, and Treatments (Proven and Unproved)
- Discuss ADHD as a Chronic Handicapping Condition (i.e. diabetes)
- Alert Them to Potential Grief Reaction
- Change Expectations (30% rule <24 yr)
- Modify Settings: Points of Performance
- Encourage Acceptance & Advocacy
- Encourage Routine Aerobic Exercising

18 Great Ideas for Management

- Parents are Shepherds, Not Engineers
- Reduce Delays, Externalize Time
- Externalize Important Information
- Externalize Motivation (Think win/win)
- Externalize Problem-Solving –
  - make it manual
- Use Immediate Feedback
- Increase Frequency of Consequences
- Increase Accountability to Others
- Use More Salient & Artificial Rewards

More of the 18 Great Ideas

- Change Rewards Periodically
- Touch More, Talk Less
- Act, Don't Yak
- Keep Your Sense of Humor
- Use Rewards Before Punishment
- Anticipate Problem Settings
  - Make A Plan
- Keep A Sense of Priorities
- Maintain a Disability Perspective
- Practice Forgiveness
  - (Child, Self, Others)

Parent Training Options

- Defiant Children (Barkley)
- Parents are Teachers (Becker)
- Managing Child Behavior (Patterson)
- Parent-Child Interaction Therapy (Eyberg)
- Triple P (Sanders)
- COPE (Cunningham)
- The Incredible Years (Webster-Stratton)
- Parent Coaching Cards (Richfield)
- 1-2-3 Magic (Phelan)
- The Explosive Child (Greene & Ablom)

More on Parent Training

- Effectiveness declines with age
  - Children (<11 yrs., 65-75% respond)
  - Adolescents (25-30% show reliable change)
- Minor differences in program effectiveness
  - Most effective components are increasing positive parent-child relations, emotional communication skills, time out, consistency in delivery consequences, and in-session practice of skills with homework assignments
- Effects are greater on oppositional behavior than on ADHD symptoms
- Providing information on ADHD and related disorders and professional support accounts for the majority of change in child disruptive behavior
- No new trends evident in last decade

Medications

ADHD FDA Approved Medications

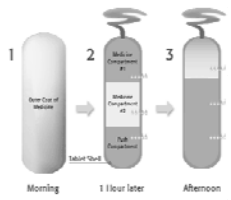
- Stimulants
  - Methylphenidate (1957):
  - Amphetamine (1930s)
- Atomoxetine (2003)
- Guanfacine XR (2009)

Stimulant Medications

- Most well-studied drugs in psychiatry
  - Used 40+ yrs; 350+ studies; thousands of cases
- Stimulants (Response rates 75-80%)
  - Methylphenidate
  - Amphetamines:
  - Pemoline (discontinue use)
- Trying all stimulants - 90%+ response rate
- What's new?
  - Extended release delivery systems
    - The 5 Ps - Pills, pumps, pellets, patches, pro-drug

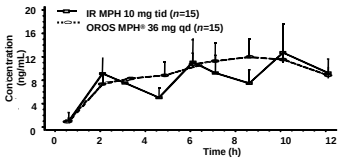
Connor, D. (2006). Stimulants. In Barkley, R. A. (Ed.), *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment.* New York: Guilford.

OROS: A New Delivery System

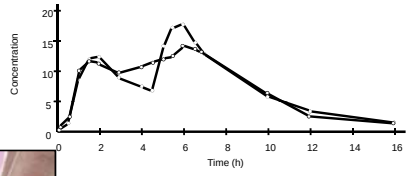


- OROS technology
- creates an osmotic pump
- Activated by water absorption in the stomach and intestinal track
- Pressure delivers a continuous flow of liquid methylphenidate
- Lasts 10-12+ hours
- Same effects and side effects as regular methylphenidate

MPH OROS

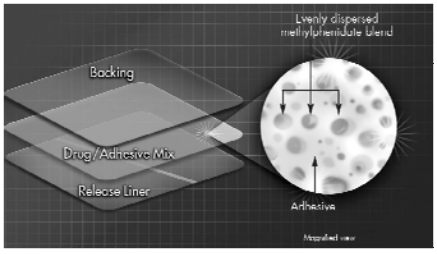


Pulse Delivery System (Diffucaps, Microtrol, SODAS)



DOT Matrix Transdermal Technology

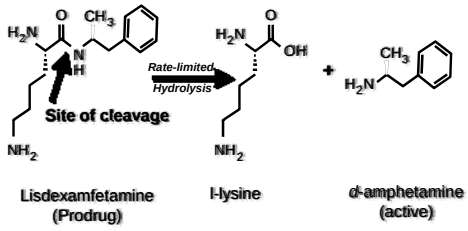
- Methylphenidate is mixed with adhesive



What Is lisdexamfetamine?

- A long-acting, prodrug stimulant (lisdexamfetamine)
- Once-daily medication indicated for the treatment of ADHD
  - The efficacy and tolerability were evaluated in children aged 6 to 12 years
- Capsules available in multiple dosage strengths
  - 30 mg
  - 50 mg
  - 70 mg
- Can be taken with or without food
- Can be dissolved in water

Chemical Structure of Lisdexamfetamine



- a prodrug that is therapeutically inactive until it is converted to active *d*-amphetamine in the body

Lisdexamphetamine: Efficacy Summary

- Provided significant reductions in ADHD symptoms at all doses (30, 50, or 70 mg/d)
- Provided extended duration of response throughout the day including at approximately 6 PM
- Significantly improved math test scores up to 12+ hours
- 70% of patients were much/very much improved

Biederman, J. et al. (2007). *Biological Psychiatry, doi: 10.1016/j.biopsych.2007.04.015*

Atomoxetine

- Exclusive noradrenergic reuptake inhibitor
- Unscheduled (not Schedule II); no abuse potential
- Approved in US January 2003 by FDA; tested in more than 6,000 cases worldwide
- Used with more than 4.5 million patients to date
- Effective for kids, teens, and adults with ADHD
- Equal efficacy with methylphenidate for new, medication naïve cases; slightly lower success rates in children previously on stimulants
  - But effect sizes are somewhat smaller .6-.8 vs. .7-1.0
- 75%+ positive response rate in new cases, 55% in previous stimulant treated cases
- Sustained response demonstrated for up to 3 years
- Increasing improvement with time on drug
- Can be given once daily (in AM) or split (AM/PM)
- Provides 24 hour treatment coverage for ADHD symptoms

Barkley, R. A. (2009). What is the role of atomoxetine in the management of ADHD? *The ADHD Report, 17(2)*, 1-11, 16.

Guanfacine XR

- Alpha2a agonist previously used in IR form as antihypertensive
- XR form FDA approved for use with ADHD in late 2009
  - Tablets, 1-4 mg, dosing no higher than 4 mg, don't break or chew tablets
- Guanfacine XR improves both dimensions of ADHD symptoms and is better than guanfacine IR and clonidine for ADHD due to less sedation, less effects on cardiac functioning, safer if suddenly discontinued
- Effect sizes = .42-.54 (.01-.08mg/kg), .98 to 1.22 (.09-.17mg/kg)
  - Approximately 50-65% reduction in symptoms from baseline
- Can be combined with stimulants for broader coverage
- May be most optimal for inattention (working memory) and emotion regulation (& oppositional) deficits but does reduce both ADHD symptom dimensions significantly
- Alpha2a agonists work directly in the frontal cortex to fine tune and enhance neuronal signals
- Does not exacerbate pre-existing tics or anxiety
- Given once daily, effects continue throughout the day to the next morning. Can be given any time of day
- Given at bedtime, may improve sleep onset problems

Source: Biederman, J. et al. (2008). *Pediatrics, 121, 73-84.*

Choosing Medications – Issues Related to Context

- Urgency of control of symptoms
- Duration of action
- Consumer acceptability
- Parental capacity to supervise med use
- Family or personal history of adverse reactions
- Presence of drug abuser in family
- Patient living at school or college campus
- Availability and affordability (of drug and medical follow-up)

Medication Issues – Patient Characteristics

- Concurrent drugs in use by patient
- Patient age
  - preschoolers are less responsive to stimulants
- Etiology of ADHD
  - acquired cases are less responsive to stimulants
- Patient sex
  - Females have peak stimulant effects earlier and reduced effects later in the day
- Type of attention disorder
  - ADHD more responsive to stimulants than SCT

Patient Comorbidity

- Pre-existing growth issues
  - Small but significant effects of meds on growth delays
- Pre-existing bedtime or sleep problems
  - Stimulant induced insomnia must be considered
- Degree of anxiety or OCD
  - Anxiety/OCD may be worsened by stimulants - arguable
  - Working memory may be impaired in anxious cases
- Degree of tics or Tourette's Syndrome
  - Amphetamines are more likely than MPH to exacerbate pre-existing tics; atomoxetine does not affect tics
- Presence of math disorder
  - reduces MPH response (37% vs 75%)

School Management

Basic Considerations

- Have a school ADHD liaison for parent-teacher coordinated care
- Don't retain in grade!
- Sept is to establish behavioral control
- Decrease total workload, or
- Give smaller quotas of work at a time
- Use traditional desk arrangement
- Seat child close to teaching area

More Basic Considerations

- Target productivity first, accuracy later
- Don't send home unfinished class work for parents to do - home is not the "point of performance" for class work
- Give weekly homework assignments in advance for better parent preparation
- Reduce/eliminate homework – grades 1-6
  - Overall correlation with achievement is just .15-.25 (just 2-6% of variance in achievement) across all grades and weaker in elementary grades*
  - For high school, best amount was 1.5-2.5 hrs/night; more hours had no further benefits*
- During homework: Some noise or music benefits work performance (but deteriorates it in normal kids)**

*Cooper, Robinson, & Patall (2006). *Review of Educational Research, 76(1)*, 1-62.
**Soderlund et al. (2007). *Journal of Child Psychology and Psychiatry, 48*, 840-847.

Peer Tutoring

- Create & distribute scripts (work sheets)
- Teach any new concepts and skills to class
- Provide initial instructions for work, then
- Break class into dyads
- Have one student tutor & quiz the other
- Circulate, supervise, and coach dyads
- Alternate tutor/student roles in dyad
- Re-organize into new dyads weekly
- Graph & post quiz results

Classroom Management Tips:

- Allow some restlessness at work area
- Give frequent exercise breaks
- Get color-coded binders & organizing systems for classwork/homework
- Use participatory teaching methods
  - Child actively involved in teaching the lesson
- Practice skills drills on computers
- Try laminated work slates for writing down and displaying answer, not hands in air and fastest responder wins
- Assign a homework "study-buddy"
  - Peer tutoring at home for homework

More Classroom Suggestions:

- Intersperse low with high appeal activities
- Be more animated and theatrical
- Touch child on shoulder or arm when praising, reprimanding, or instructing
- Schedule the most difficult subjects in AM
- Use direct instruction, programmed learning, or highly structured materials
- Have child choose initial work goal
- Train keyboarding in early grades
- Give after-school help-sessions, tutoring, books on tape, videos, etc.
- Require continuous note-taking during lectures & while reading

Increasing Incentives

- Increase praise, approval, appreciation
  - Be a 1-minute manager
- Use a token or point system to organize consequences – to increase available rewards:
  - Get parents to send in old games/toys
  - Get a video game donated to the class
- Try team-based (group) rewards
  - (4-5 students work as a team on assignments)
- Try a tone-tape with self-rewards
  - Variable interval schedule of tones played during desk work periods
  - When tone sounds, child self-rewards points
  - Teachers monitor for cheating
- Allow access to rewards often each day
- Keep reward:punishment ratio 2:1+
- Consider a daily behavior report card

A Daily Behavior Card

Each teacher rates each behavior at end of each class; 1=Excellent (+25), 2=Good (+15), 3=Fair (+5), 4=Poor (-15), 5=Terrible (-25)

Subjects	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Class Participation							
Performs assigned classwork							
Follows class rules							
Gets along well with others							
Completes home-work assignments							
Teacher's Initials							

Externalizing Rules and Time

- Post rules on posters for each work period
- 3-sided stop sign for rules for young kids
  - red = lecture rules
  - yellow = desk work rules
  - green = play rules
- Laminated color-coded card sets placed on desk with a card of rules for each subject or class activity
- Child restates rules at start of each activity
- Use timers, watches, taped time signals, etc.

The Punishment Hierarchy

- Mild, private, direct reprimands work – personalize it
- Swift justice is the key to discipline
- "Do A Task" (a variation on time out)
  - Desk at back of class with worksheets
  - Child told what they did wrong and given a number
  - Child does that number of worksheets while timed out
- Response Cost (loss of tokens)
- Moral essays – "Why I will not hit others"
- Establish a "chill out" location
- Formal time out in class or private room
  - Hallway time outs don't work
- In-school suspension or go to BD class

"Challenging Horizons" After-school program for teens

- 2 days per week for 2 hours each at school
- Uses groups and 1:1 delivery
  - Therapists are paraprofessionals – M.A. level
- Program includes:
  - Academic tutoring & homework assistance
  - Organizational, study and self-monitoring skills
  - Social skills training
  - Recreational skills and deportment
    - Encouraged generalization of social skills
  - Group level token system for behavior control
  - Consult with teachers on behavior management methods
  - Parent education and training
    - 3 sessions/2 hrs. each

Challenging Horizons

- Treatment precludes worsening of adjustment over time evident in untreated students
  - Treatment reduces & forestalls failure events
- Reduces ADHD symptoms at school
- Improves academic performance
- Improves internalizing symptoms
  - But not delinquent or conduct disorder behavior
- Boosts medication effects
- High parent/teacher acceptability and satisfaction
- Less costly than clinic-based services
- Greater teen participation in treatment

Molina, B. S. et al. (2008). *Journal of Attention Disorders, 12(3), 207-217.*
molinab@upmc.edu
Schultz, B. et al. (2009). School Psychology Review, 38(1), 14-27.

Other Tips for Teens

- As needed, use ADHD medications
- Find a "Coach" or "Mentor" (Just 15 min.)
  - The Coaches' office is the student's "locker"
  - Schedule in three 5-minute checkups across each day
  - Use behavior report card to monitor teen across classes
  - Use daily assignment sheets requiring teacher initials
  - Cross temporal accountability is the key to success
- Identify a parent-school ADHD liaison
  - Serves as an intermediary on issues between parents & school
- Use a daily school behavior card for self-evaluation after ; move to weekly after 3+ good weeks
- Keep extra set of books at home
- Learn typing/keyboard skills for writing assignments
- Tape record important lectures – check out the Smart Pen that digitally records lectures or other conversations at livescribe.com

More Tips for Teens

- "Bucks for Bs" system
  - grades on each assignment = $ from parents
- Get week-at-a glance calendar with journal or other organizing notebook system
- Schedule hard classes in AM
- Alternate required with elective classes
- Extra time on timed tests (???) – no evidence it helps
  - Better to have distraction free test setting and breaks after shorter test periods (time off the clock)
- Permit music during homework
- Get written syllabus as handouts
- Require continuous note-taking to pay attention to lectures or during reading assignments

Still More Tips for Teens

- Learn SQ4R for reading comprehension
  - Survey material, draft questions, then:
  - Read, recite, write, review
- Peer tutoring in class
- "Study-with-a-buddy" after school
- Find "fall-back" classmates (swap phone, e-mail, & fax numbers) for lost or missing assignment sheets
- Attend after-school help-sessions
- Schedule parent-teacher-teen review meetings every 6 weeks (not at 9 week grading period)

Conclusions

- ADHD is a prevalent disorder that is relatively chronic disorder for most individuals diagnosed with it
- ADHD is disorder of executive functioning and self-regulation over time toward goals
- The disorder is associated with impairments in nearly all major life activities
- Yet the disorder is highly treatable, having more treatments that result in more improvement in symptoms for more people than for any other psychiatric disorder
- The greatest problems in management are availability, accessibility, affordability, and adherence over time