

Advances in the Major Evidence Based Treatments for ADHD

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Advances in Psychosocial Treatment

- Parent education about ADHD changes families
 - Learning the value and limitations of parent training
 - Changes mainly defiance and parent-child conflict, less so ADHD
 - Works best in younger children
 - (<11 yrs., 65-75% respond; falls to 25-35% for teens)
 - Effectiveness of classroom behavior management is now solidly established but is time, setting, and person limited
 - Routine physical exercise (for coping not curing)
 - Improving sleep (duration)
 - some impact on next day inattention
 - Effectiveness of cognitive behavioral training of EF deficits in adults with ADHD (Mary Solanto, J. Russell Ramsay, Steve Safren)
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Side Effects of Psychosocial Treatments

- May increase patient and family distress
- Can increase stigma or fear of stigma in children and teens
- Family or couples sessions may increase conflict with others
- Can increase patient anxiety, dissociative episodes, re-experiencing of traumatic events
- BPT and BFT may increase aggression and family conflict
 - Group training of children and teens can lead to deviancy training
- May cause a worsening of disorder symptoms
- Can delay getting more effective treatment (i.e. medications)
- May be more expensive than other therapies (meds.)
- Often not monitored or detected by treating clinicians who fail to consider the potential to produce harm
- Less likely to be reported to clinician by patient due to perception it may adversely impact relationship



What to do about them

- Be aware that they exist and may affect up to 25% or more patients
- Determine if cases are in high-risk categories for such side effects
- Periodically monitor both symptoms and side effects – take time in meetings to discuss
- Encourage patients (and others implementing treatments) to report them
- View such monitoring and reporting as good clinical practice, not bad outcomes

Experimental Psychosocial Treatments

- Friendship Coaching – training parents as social skills therapists for their ADHD children – good evidence to date
- Challenging Horizons Program – good evidence to date
 - after school supplemental training for teens focusing on social, recreational, and academic remediation
- Time Management and Organization Training
 - Equivalent to standard behavior management training
- Preschool play curriculum -- for kids at-risk for EF deficits
 - Two separate curricula & studies: Adele Diamond & Jeffrey Halperin
- Mindfulness meditation training
 - Mixed results, some promising, but most studies are not rigorously done

More Experimental Treatments

- Transcranial magnetic stimulation (noninvasive)
 - Mixed effects in only a few studies to date (Rubio, B et al., *Journal of Child Neurology*,
- Trigeminal nerve stimulation – 1 pilot study, good results, but was company funded and needs replication
- fMRI biofeedback – 1 pilot study with teens, good results
- Omega 3 or 3/6 Fatty Acids (Fish Oil)
 - studies show mixed results (effects at home on parent ratings, no effect at school on teacher ratings); Cochrane 2012 meta-analysis finds no effects. Effects found are small in magnitude, more for omega 3s, and mainly on inattention for a minority of inattentive only cases (25%), if any effects are found at all

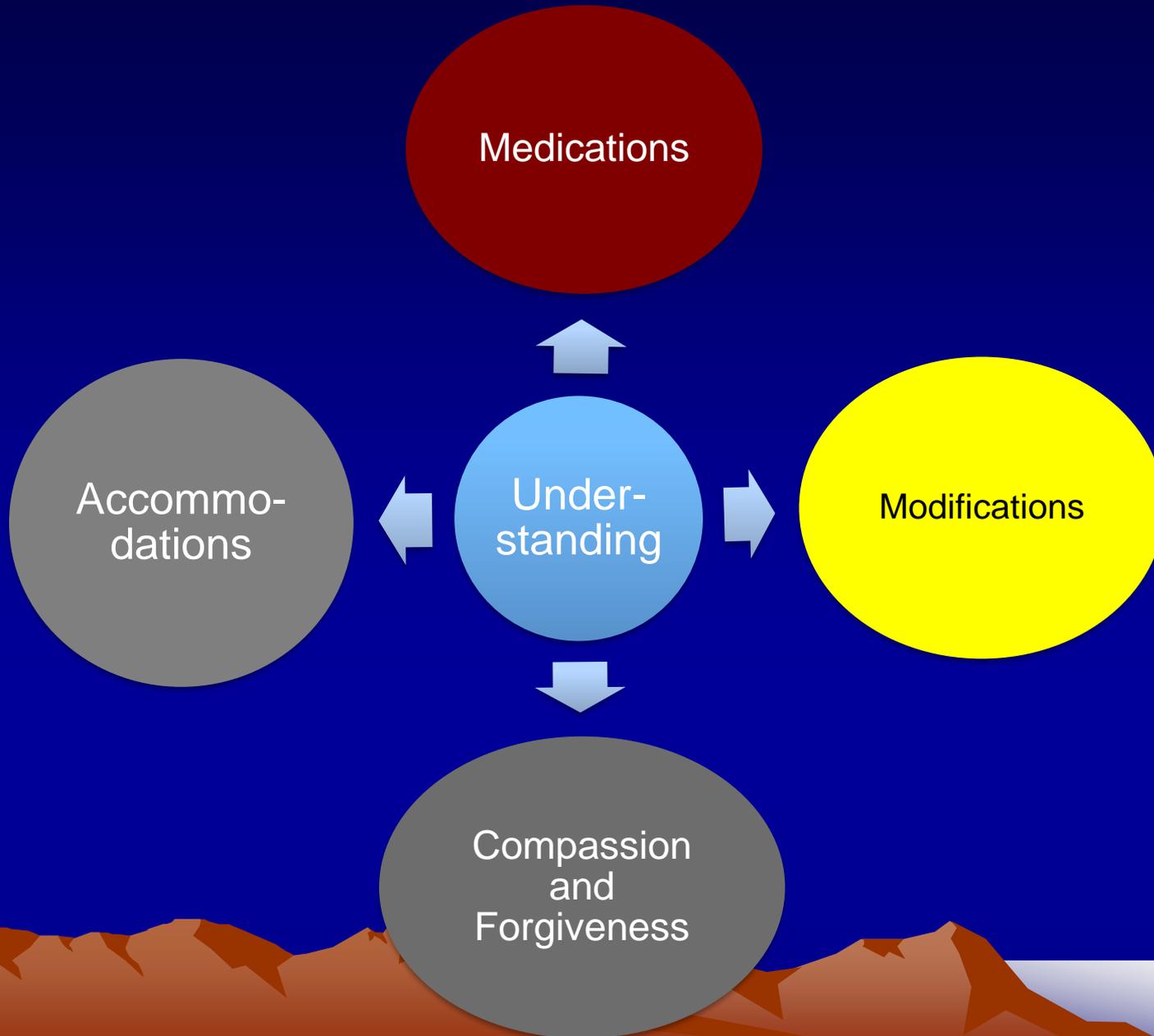
Unproven/Disproven Therapies

- Elimination Diets – removal of sugar, additives, etc. (Some evidence for food colorings – effect sizes of .23 or lower)
- Megavitamins, Anti-oxidants, Minerals (No compelling proof or have been disproved)
- Sensory Integration Training (disproved)
- Chiropractic Skull Manipulation (no proof)
- Play Therapy, Psycho-therapy (disproved)
- Self-Control (Cognitive) Therapies for Children (disproved)
- Social Skills Therapies for Children (in clinic)
 - Better for Inattentive (SCT) Type and Anxious Cases
- Neurofeedback (EEG)*
 - Numerous positive clinical studies but all suffer serious flaws in their methods; 5 randomized placebo-controlled trials find no benefits
- Training of executive functions (espec. working memory)
 - CogMed, Nintendo with Brain Age game, Lumosity.com, mybraintrainer.com, e-mindfitness.com, happyneuron.com, positsscience.com

Counseling Parents



The Ideal Treatment Package for ADHD



Counseling Parents

- Review ADHD: Nature, Causes, Course, and Treatments (Proven and Unproven)
- Acknowledge increased parenting stress, family conflict, and adverse parental health consequences related to child ADHD
- 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
- Discuss the Proven and Unproven Treatments

The Value of the Concept of Delayed Executive Age in ADHD

- ADHD appears to delay EF development by 25-40%, or an average of 30%
- Use this estimate to understand a child's executive age or EA (chronological age minus 30%)
- Adjust expectations to match this EA
- Determine new responsibilities and freedoms based on their EA not their CA
- Provide accommodations or scaffolding to support the child at this EA

Parent Training Program 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)
 - Problem-solving communication training with cognitive behavioral therapy may be better than BPT for teens
- 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 treatments evident in last decade

Managing ADHD in School



Ideas for Desk Work

- Target productivity first, accuracy later
- Decrease total workload, or
- Give smaller quotas of work at a time
- Allow child to choose the initial quota
- Use participatory teaching methods
 - Child actively involved in teaching the lesson
- Practice skills drills on computers
- Allow some restlessness at work area
 - Consider having child sit on balance ball
- Give frequent exercise breaks

About That Homework

- 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*
- 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
- 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.

More Classroom Suggestions:

- Require continuous note-taking during lectures & while reading
- Use the SQ4R system for improving reading comprehension
 - Survey, questions, read, recite, write, review
- Get color-coded binders & other organizing systems for classwork
- Give after-school help-sessions, tutoring, books on tape, videos, etc.
- Train keyboarding in early grades
- Establish “behavioral contracts”

Components of Behavioral Contracts

- Sets forth academic work and behavioral goals explicitly and clearly
 - I agree to complete all of my written math and language arts work with at least 80% accuracy
 - I will remain quiet, follow directions, and listen
- Specifies rewards to be earned explicitly
 - 15 extra minutes of playtime at end of school day
 - Access to special “reserved” toys or play activities
 - Use class computer for play or work for 15 extra minutes
 - Receive 10 points for every task completed accurately
 - Help my teacher by completing some errands or in-class jobs
 - If I have a successful week, I will earn a special activity with my parents
- Specifies punishment explicitly
 - Loss of 10 points or tokens for each task not completed
 - 5 Sheets of “do a task” in time out

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
- Allow peer tutoring for homework – find child a “study-buddy” in their neighborhood

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
- Allow access to rewards often each day
- Keep reward - punishment ratio 2:1+
 - Remember – its an incentive program

Attention Training System

Gordon Systems, gsi.com



The Motivaider & Invisible Clock

Habitchange.com

addwarehouse.com



Using School-Home Reports with Home-Based Consequences

- Daily goals stated in positive manner
- Specifies behavioral and academic goals
- Targets a small number of goals
- Teacher provides quantitative feedback
- Feedback provided at end of each class
- Regular communication with parents (daily)
- Consequences at home are tied to school behavior and performance (short & long-term)
- Solicit parental cooperation before starting
- Student input into goals is solicited for older children and teens
- Review weekly for modifications

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)

<i>Subjects</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
<i>Class Participation</i>							
<i>Performs assigned classwork</i>							
<i>Follows class rules</i>							
<i>Gets along well with others</i>							
<i>Completes homework assignments</i>							
<i>Teacher's Initials</i>							

Problem Transitions? Make a Plan

- Before entering a new situation, STOP! (in school this might be the next class, recess, going to lunch room)(at home, this would be any transition to a new task or situation (homework, bedtime, chores, shopping trip, dining out, church, visiting others, etc.)
- Review 2-3 rules child needs to obey
 - Child repeats them back
- Establish an incentive or reward
- Establish the punishment to be used
- Be sure child has something active to do
- Enter the new situation, follow your plan
- Reward throughout the activity
- End by evaluating success with the child

Externalizing Rules and Time

- Post rules on posters at front of class for each work period,
- Use 3-sided stop sign for rules for young kids. Show the appropriate side for each activity: red side = lecture rules; yellow side = desk work rules; greenside = play rules
- Laminated color-coded card sets placed on desk with each card listing the basic rules or steps to be followed for each subject or class activity in school or each recurring task (i.e. homework) or chore (clean up).
- Child reviews the posted rules or steps and then verbally restates them at the start of each activity. Child can also place a checkmark next to each step as it is done.
- Use timers, watches, large clocks, etc. if the task has a time limit.

Disciplinary Tactics

- Incentives for appropriate behavior must be present for punishment (loss of reward access) to be effective
- But all-reward programs do not last long with ADHD children unless accompanied with punishment tactics
- Swift justice is the key to discipline
- Mild, private, direct reprimands work – personalize it
- Response Cost (loss of tokens)
- “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

More Punishment Tactics

- Threaten to use your smart phone to record outbursts or tantrums that will be emailed to parent
- Moral essays – “Why I will not hit others”
- Establish a “chill out” location – for recovering self-control
- Formal time out in class room
 - Hallway time outs don’t work
- In-school suspension

Keys to Effective Time Outs

- Implement only when there is a reinforcing environment to be removed from
- Use when function of child's behavior is attention-getting
- Employ swiftly upon rule infraction (10 sec.)
- Use smallest amount of time out
 - 1-min./year of age
- Location is to be visible to teacher
- Terminate when:
 - Time out interval has been served
 - Child is quiet for brief period of time
 - Child agrees to obey rule that was broken

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
- Keep extra set of books at home
- Tape record important lectures – check out the Smart Pen that digitally records lectures or other conversations at livescribe.com

The SmartPen

Livescribe.com



A computer in a pen that helps you **never miss a word™**. Pulse™ records everything you hear, say and write, and links your audio recordings to your notes. Find the most important information from your meetings or lectures just by tapping on what you wrote.

2GB of memory can hold over 200 hours of audio. Actual recording time varies by audio quality setting.

More Tips for Teens

- Get a Week-at-a Glance calendar, a journal, or other organizing notebook
- Extra time on timed tests ???
 - No evidence it preferentially benefits disabled students – at most 20-30 minutes maximum
 - Better to have distraction free test setting and breaks after short testing periods (time off the clock)
- Get written syllabus as handouts
- Require continuous note-taking to pay attention to lectures or during reading assignments

Still More Tips for Teens

- Use SQ4R for reading comprehension
- Find “fall-back” classmates (swap phone, e-mail, & fax numbers) for lost or missing assignment sheets
- Require teen to attend after-school help-sessions
- “Bucks for Bs” system – parents pay money for grades on assignments
- Schedule parent-teacher-teen review meetings every 6 weeks (not at 9 week grading period)

Medication Management



Why Medicate?

- ADHD meds have a sizeable evidence base
- Their safety is incredibly well established
- They improve 70-90 percent of clinical cases, normalizing 50-60% of such cases
- They are convenient to administer
- Psychosocial treatments produce side effects that may not be tolerable
- They are less expensive than psychosocial ones
- They can be used for years, even into adulthood
- They are active in community settings where no caregivers may be present to provide active treatment (unsupervised activities, driving alone or with friends, free time in schools, bus rides, etc.)
- They may offer the possibility of neuro-protection (actually neuro-enhancement) over time (?)

US Approved ADHD Medication Types

- Dopamine agonists - Stimulants
 - Methylphenidate (1957):
 - Amphetamine (1930s)
- Norepinephrine reuptake inhibitors - Atomoxetine (Strattera)
- Alpha-2 agonists – extended release
 - Guanfacine XR (Intuniv)
 - Clonidine XR (Capvay)

Stimulant Medications

- Stimulants (Response rates 75-80%)
 - Methylphenidate
 - Amphetamines:
 - Pemoline (discontinued)
- Trying all stimulants - 90%+ response rate
- Average medication duration is about 3 yrs
 - Discontinuation linked to degree of side effects and parents not being told about effects, side effects, and dosing
- What's new?
 - Extended release delivery systems
 - Pills, pumps, pellets, patches, pro-drug, liquids (IR and ER)
 - 2 new developments – chewable (gummy) amphetamine and delayed release stimulants

Stimulants in Preschoolers

- PATS study examined 303 preschoolers (3-5.5 years old) 165 of whom entered drug trial (all received prior parent training)
- Used doses of 2.5, 5, & 7.5 mg MPH given 3x daily for 9 weeks (best dose was 14.2 mg/day \pm 8)
- Study found smaller effect sizes (.4-.8) than in school-age children, 22% normalized (vs. 55%)
- Possibly greater side effects
 - Over 8% could not tolerate drug (vs. 3% of school age)
 - Otherwise, side effects were similar to school-age children (insomnia, poor appetite, weight loss most common, some had emotional outbursts)
 - Some delayed growth, 50% less in weight gain, 20% less in height gain during acute treatment period
- Medications considered safe for use with preschoolers but with increased risk of side effects and decreased degree of change relative to older children

Stimulants: Behavioral Benefits

- Increased concentration & persistence
- Decreased impulsivity & hyperactivity
- Increased work productivity (~Accuracy)
- Decreased days absent from school
- Increased reading achievement by age 18
- Decreased likelihood of grade retention
- Better emotional control
- Decreased aggression & defiance
- Decreased antisocial activities
- Treating into adolescence lowers the likelihood of smoking and substance use disorders in adolescence

More stimulant drug benefits

- Improved Compliance & Rule Following
- Better Working Memory & Internalized Language
- Improved Handwriting & Motor Control
- Improved Self-esteem
- Decreased Punishment from Others
- Improved Peer Acceptance & Interactions
- Better Awareness of Game in Sports
- Improved Attention and Reaction Time during Driving Performance
- Reduced risk of accidental injury*
- Treats ADHD symptoms in autistic spectrum cases (greater side effects)

Connor, D. (2015). Medications for Children. In Barkley, R. A. (Ed.), *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment*. New York: Guilford.

*Raman, S. et al. (2012). *Injury Prevention*, online first, doi:10.1136/injuryprev-2012-040483

Stimulants: Side Effects*

- Benign; <5% discontinue due to adverse events
- All side effects are dose responsive
- Most common: Insomnia (50% +) Loss of Appetite (50%+), Headache (20-40%) Stomach Ache (20-40%)
- Irritable, Prone to Crying (<10%)
- Nervous Habits & Mannerisms (<10%)
 - Tics (<3%) & Tourette's (Rare)
- Mild failure to gain weight (mean = 1-4 lbs) or height (about 1 cm/yr.)
 - May be attenuated by co-administration of melatonin**
- Growth effects limited to first 1-3 years of therapy
- No evidence of chromosomal damage or cancer risk*** or of birth defects if exposed during 1st trimester****

*

Side effects - stimulants

- Increased heart rate (3-10 bpm),
- Increased blood pressure (1.5-14 mmHg)
 - Monitor higher risk African-American males
- 1.5% experience stimulant psychosis**
- No discernible long-term adverse consequences found to date
- Risk of sudden death: not founded on the facts. Base rate is 1-7 in 100,000 patient years. Rate in stimulant cases is below this base.

Stimulants: Common Myths*

- Addictive When Used as Prescribed
 - No, must be inhaled or injected
- Creates Aggressive, Assaultive Behavior
 - No, decreases aggression & antisocial actions
- Increased Risk of Seizures (No)
 - Only at very, very high doses
- Cause Tourette's Syndrome (No)
 - Can increase tics in 30%; decrease it in 35%
- ADHD kids are being over-dosed (No)
 - Nonpsychiatric MDs tend to under-dose below doses used by psychiatrists or in research (Olfson et al. (2009) *J. Amer. Acad. Child Adolesc. Psychiatry*, 48(1) [online 11/18/08])

More Myths About Stimulants*

- These drugs are over-prescribed (No)
 - 4.3 % on medication vs. 7.8% prevalence
- Greater Risk of Later Substance Abuse (No)
 - No, 15 studies find no such result; a few also found decreased risk if continued through teens
- Doesn't Improve Academic Achievement (?)
 - Not if you mean academic knowledge and not in first few years but after 2+ yrs, some effects on reading test scores
 - Improves work productivity, classroom conduct and rule-following, peer interactions, grades, reduced punishment, fewer days absent, less likely to be retained in grade



Atomoxetine

- Exclusive noradrenergic reuptake inhibitor
- Unscheduled (not Schedule II); no abuse potential
- Approved in US January 2003 by FDA; tested in more than 17,212 cases worldwide
- Used with more than 15+ 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

More on Atomoxetine

- Reduces ADHD, ODD, & aggression
- Reduces internalizing symptoms; treats anxiety
- Improves executive functioning
- Increases in school productivity
- Improved peer social behavior
- Improved self-esteem
- Improved parent-child relations
- Improved dry nights among bed-wetters
- Better “morning after” behavior
- Less insomnia (7%) than methylphenidate (30-50%) Faster time to sleep onset
- No emotional blunting – restriction of affect
- Treats ADHD in Autistic Spectrum Cases (50%+ response rate, fewer side effects than MPH in ASP cases)

Atomoxetine Is Safe and Well Tolerated When Taken as Directed

Adverse Events in Child and Teen Patients, 8–17 Years of Age, With ADHD and an Anxiety Disorder^{1*} †

Event	Strattera (n=77)	Placebo (n=80)
Decreased appetite	11 (14.3%)	3 (3.8%)
Headache	11 (14.3%)	7 (8.8%)
Abdominal pain (upper)	9 (11.7%)	4 (5.0%)
Vomiting	8 (10.4%)	4 (5.0%)
Irritability	5 (6.5%)	3 (3.8%)
Nasopharyngitis	5 (6.5%)	5 (6.3%)
Nausea	5 (6.5%)	2 (2.5%)
Cough	4 (5.2%)	5 (6.3%)
Influenza	4 (5.2%)	1 (1.3%)
Sinusitis	4 (5.2%)	3 (3.8%)

Treatment-emergent adverse events indicated no worsening of anxiety in either treatment group

Most Common Side Effects in Adult Trials²

Event †	Strattera (n=269)	Placebo (n=263)
Dry mouth	21%	6%
Insomnia and/or middle insomnia	16%	8%
Nausea	12%	5%
Constipation	10%	4%
Decreased appetite	10%	3%
Urinary retention, hesitation, and/or difficulty in micturition	8%	0%
Erectile disturbance [§]	7%	1%
Dysmenorrhea	7%	3%
Dizziness	6%	2%
Libido decreased	6%	2%
Ejaculation failure and/or disorder [§]	5%	2%

*Adverse events reported for all patients who took at least one dose of study drug; †With an incidence of $\geq 5\%$. *Events reported by at least 5% of atomoxetine patients and at least twice the rate of placebo; §Based on total number of males (atomoxetine, n=174; placebo, n=172); ||Based on total number of females (atomoxetine, n=95; placebo, n=91)

1.Data on file, Lilly Research Laboratories: STR20070131g. 2.Data on file, Lilly Research Laboratories: STR20061205c.

Other Side Effects

- Increased blood pressure (2 mm/Hg diastolic; 3 mm HG systolic); Increase of 8 bpm pulse;
- Temporary weight loss (1-5 lbs) early in therapy – first year; no further loss thereafter
- Transient minor effect on height
- Very rare effect on liver functioning (1 in 4.5 million treated cases)
- Black box warning by FDA on suicidal ideation was an over-reaction. Rare, if any, association ($5/1357 = 0.37\%$). 6% of ADHD kids and 33% of ADHD teens report suicidal ideation.
- CYP2D6 genotype results in poor metabolizers with 2-3x blood levels of extensive metabolizers but no differences in tolerability or discontinuation

Guanfacine XR & Clonidine 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

Alphas-2 Agonists - Side effects

- Somnolence (sleepiness) (32-51%)*
 - Mild to moderate, greater later in day than AM
 - Does not impair psychomotor or attention tasks
- Headache (22-26%)*, Fatigue (11-18%)*,
- Sedation (13%)*
- Abdominal pain (12-14%)
- Decreased appetite (7%), Nausea /vomiting (6%)
- Lethargy (7%), Irritability (6%)
- Cough (6%), Dry mouth (6%), Dizziness (5%)
- Mild (trivial) decreases in blood pressure/pulse
- Heart rate decrease (about 6 bpm)
- Side effects decrease over time (about 2 wks.) but can last longer
- Monitor blood levels of valproate if combined with guanfacine XR
- Don't combine with Abilify
- * =differs from placebo

7 Reasons for Early Intervention

- Reduction of symptom severity and associated executive/self-regulatory deficits
- Reduce family stress, parent-child conflict,
- Reduce risks for of impairments in major life activities (home, school, peers, community)
- Reduce risks for health-related problems
- Reduce risks for comorbid disorders, both externalizing (oppositional, conduct) and internalizing (anxiety, depression)
- Reduce economic burden to family & society
- Neuro-protection: accelerated brain growth?

Conclusions

- ADHD is best viewed as a disorder of self-regulation and executive functioning in terms of understanding treatment
 - Internally represented information is not guiding behavior across time toward future events as well as in typical people – time blindness
- Several advances in medication delivery systems and in new medication options occurred in the past decade
 - The most remarkable advance may be in discovering a neuroprotective effect of long-term medication use that facilitates brain development and functioning
- Some advances have been made in modifying previous psychosocial treatments and in developing new ones
- Given the available evidence-based treatments, it can be concluded that ADHD is among the most treatable psychiatric disorders
- The greatest problems currently are access to evidence-based treatments, cost, and getting patients to remain in treatment through the critical adolescent years.