TREATMENT OF ADHD

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Speaker:

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Disclosures

Neither I nor my spouse/partner have
a relevant financial relationship with a commercial interest to disclose

- Think of ADHD as a 3 legged stool

  Inattention, Impulsivity, Hyperactivity

- Think of treatment as a 3 pronged approach Pharmacotherapy, Behavior therapy, Accommodations

Treatment

- The defining study for school age children is the M.T.A study
- 1) medication alone – methylphenidate
- 2) medication and behavior therapy
- 3) behavior therapy alone
- 4) treatment as usual

Results: Meds alone – very good

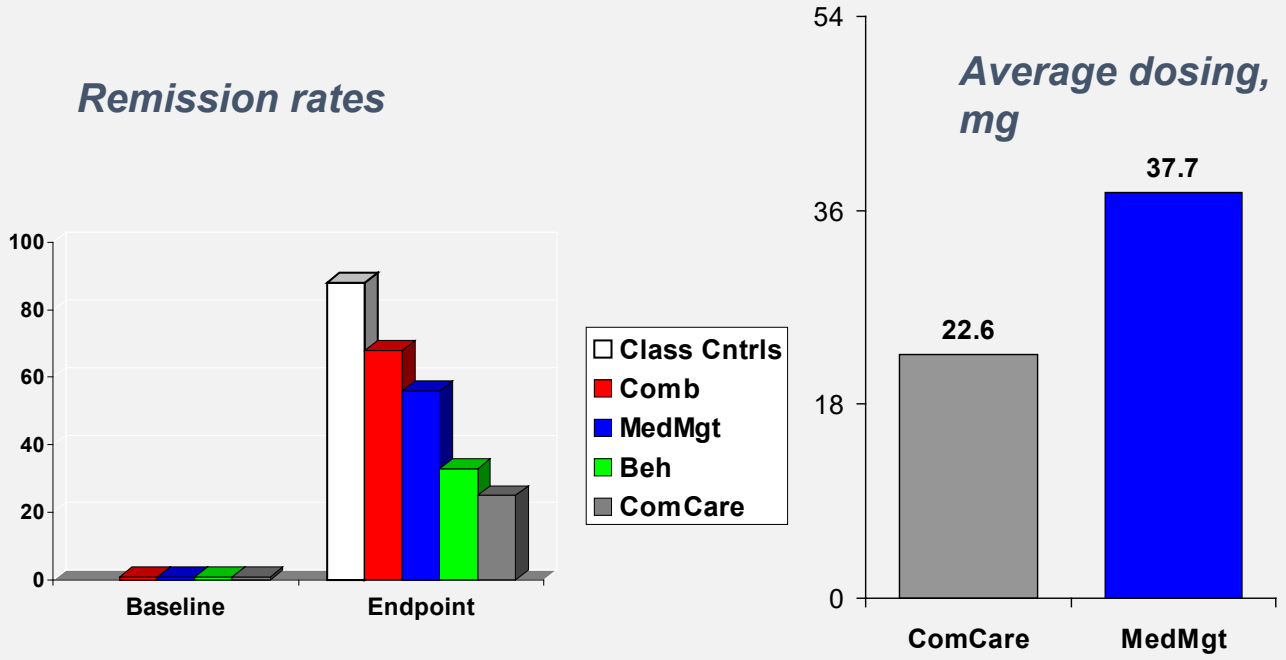
Meds and behavioral therapy- confers 10% advantage especially for anxious kids

Behavior therapy ALONE little benefit

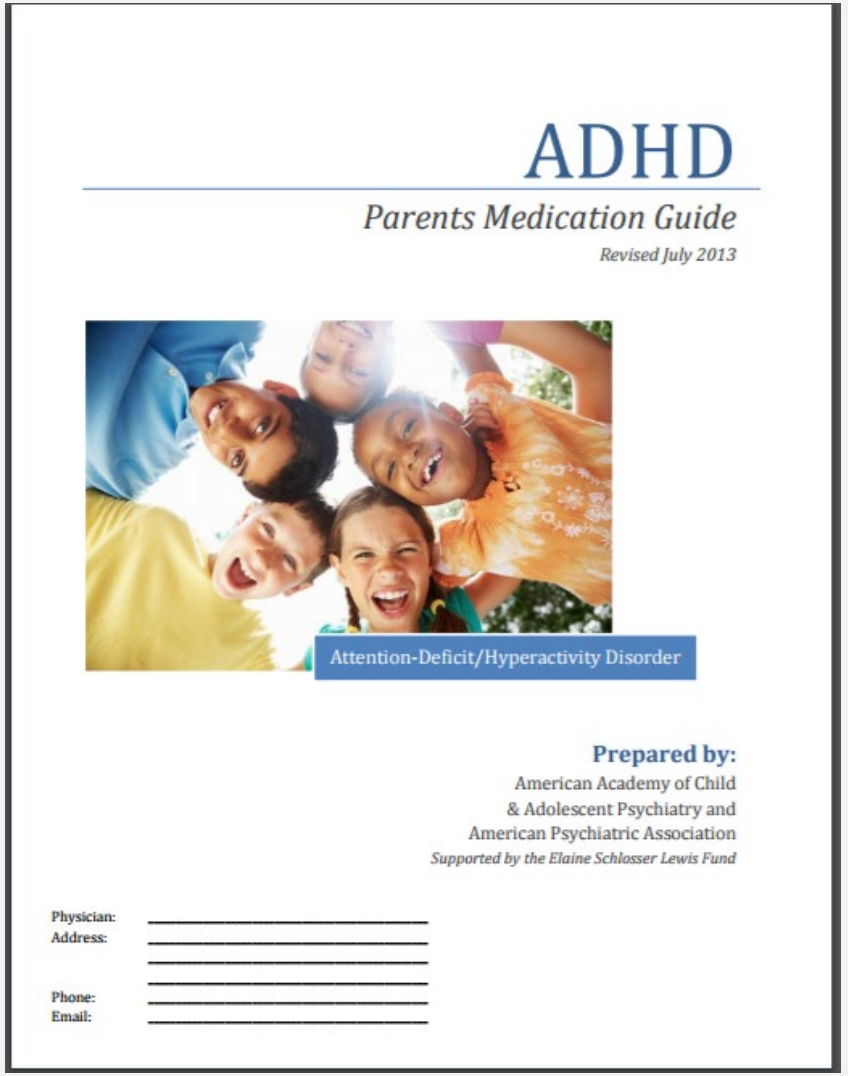
Treatment as usual - poor

MTA Study:

Remission Rate Increased with Increasing Dose



Swanson et al. *JAACAP* 2001;40:168-79; Greenhill et al. *JAACAP* 2001;40:180-7



ADHD

Parents Medication Guide

Revised July 2013

Prepared by:

American Academy of Child
& Adolescent Psychiatry and
American Psychiatric Association

Supported by the Elaine Schlosser Lewis Fund

Physician: _____
Address: _____
_____
_____
Phone: _____
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The ADHD Medication Guide

Thanks to Dr. Andrew Adesman, Dev. Peds Northwell Health

ADHD Meds

- Methylphenidate derivatives – 70-90% response rate
- Amphetamine derivatives – 70-90% response rate
- Atomoxetine
- Alpha 2 agonists – short acting Catapres (Clonidine)and Tenex (Guanfacine) long acting Kapvay and Intuniv
- Wellbutrin
- Tricyclics – Imipramine, Desipramine
- May need trials of several doses and preparations to find best response. Weight based dosing NOT valid
- Use rating scale data to determine place of optimum response and duration of action of AM dose
- Supplement as needed for across the day coverage

Stimulants: Similarities and Differences

- Stimulants first line (effect size 1.0 VS. 0.6 for atomoxetine, alpha agonists)
- 65-75% respond to one class; up to 90% respond to either
- Differences in preps primarily in duration of action (AMP>MPH, LA vs. IR)

Dose Effect Time of Stimulant Preparations (hours)-

- Methylphenidate (Ritalin)(Focalin) 4
- Dextro/Levo amphetamine (Adderall) 6
- Ritalin LA/Metadate CD/ 6-8
- Focalin XR 8
- Concerta MPH 10-12
- Adderall XR 8-12
- Vyvanse 10-12

**Different charts say different things and people are variable!

Side Effects

- Insomnia
- Headaches
- Stomachaches
- Decreased appetite/growth
- Possible increase in tics
- Increased emotionality/social withdrawal
- Over focusing/blunting
- Rare – psychosis
- Palpitations, ↑ blood pressure
- Sudden death with structural cardiac abnormalities
- Diversion

Titration and Follow-Up

- Stimulants work right away
- Side effects can occur right away
- Follow up in one week either by phone or in –person
- You want dose that causes maximum effect with minimum side effects.
- Keep going up until remission is hit—Improvement is not enough!
- You can always dial down if you went too high.
- Get new rating scales and side effect scales.
- Follow-up after each dose change (don't wait a month).
- Once correct med and dose is found, see monthly as multimodal plan is put in place.
- Every three months once all is stable.
- Reassess every new school year about 3 weeks into school
- Monitoring: height, weight, pulse and blood pressure

Alternative to Stimulants (None, really)

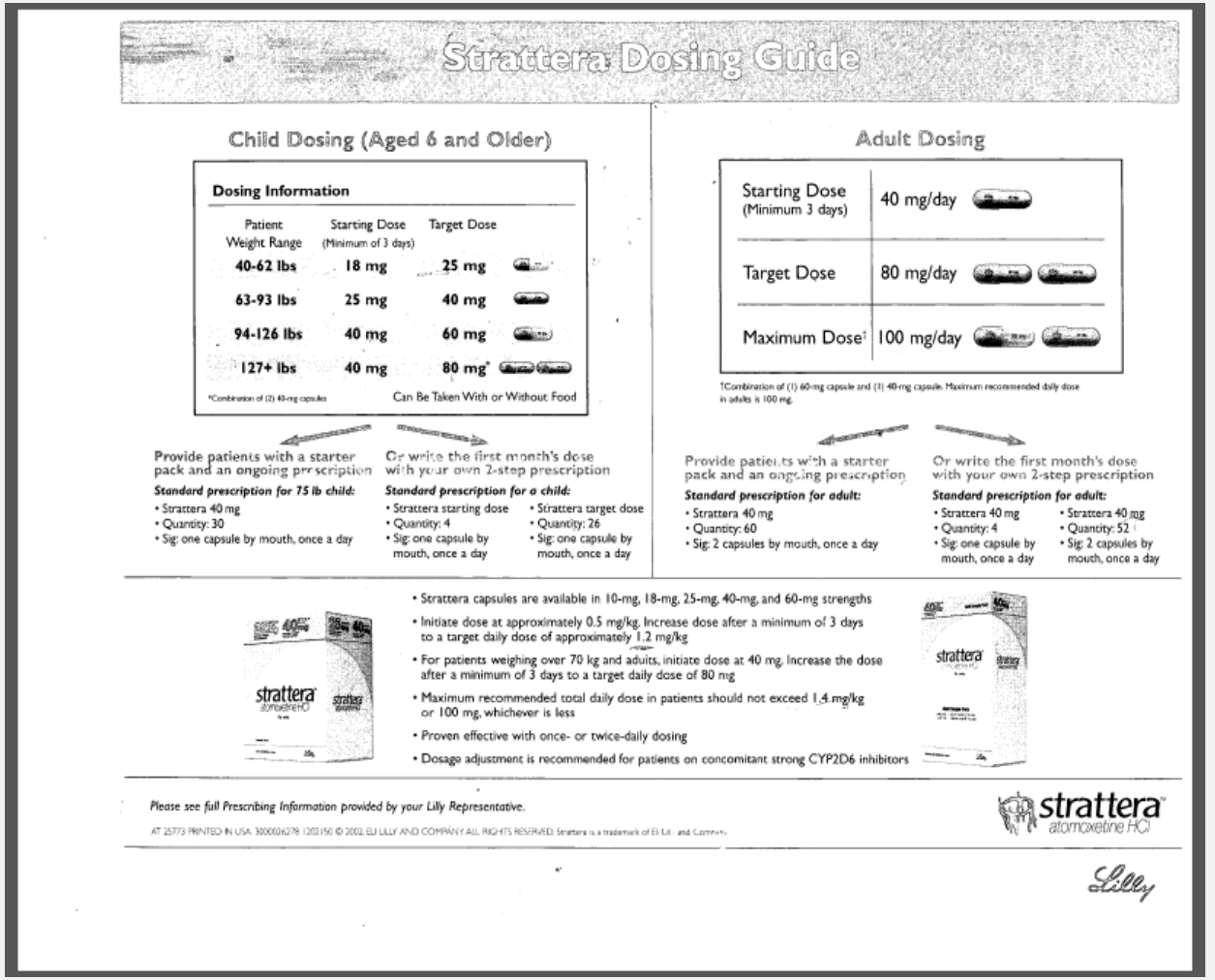
Atomoxetine (Strattera)

Alpha 2-Agonists (Clonidine, Catapres, guanfacine, Intuniv, Kapvay)

- Although there is evidence to support their relative effect compared to placebo, the gold standard is the stimulants due to a much larger effect size

Atomoxetine

- Dosing based on weight: see table
- Rare accounts of liver damage, suicidal ideation
- Common AEs: irritability, sedation or insomnia, decreased appetite, GI
- Advantages:
  - Once Daily dosing
  - Little abuse potential (adolescents)
  - No apparent effects on growth
  - Does not seem to exacerbate tics
- Disadvantages:
  - Delayed onset (takes 3-6 weeks)
  - Generally not as effective



Strattera Dosing Guide

Child Dosing (Aged 6 and Older)

Dosing Information

Patient Weight Range	Starting Dose (Minimum of 3 days)	Target Dose
40-62 lbs	18 mg	25 mg
63-93 lbs	25 mg	40 mg
94-126 lbs	40 mg	60 mg
127+ lbs	40 mg	80 mg*

*Combination of (2) 40-mg capsules

Can Be Taken With or Without Food

Provide patients with a starter pack and an ongoing prescription

Standard prescription for 75 lb child:
- Strattera 40 mg
- Quantity: 30
- Sig: one capsule by mouth, once a day

Or write the first month's dose with your own 2-step prescription

Standard prescription for a child:
- Strattera starting dose
- Quantity: 4
- Sig: one capsule by mouth, once a day
- Strattera target dose
- Quantity: 26
- Sig: one capsule by mouth, once a day

Adult Dosing

Starting Dose (Minimum 3 days)	40 mg/day
Target Dose	80 mg/day
Maximum Dose†	100 mg/day

†Combination of (1) 60-mg capsule and (1) 40-mg capsule. Maximum recommended daily dose in adults is 100 mg.

Provide patients with a starter pack and an ongoing prescription

Standard prescription for adult:
- Strattera 40 mg
- Quantity: 60
- Sig: 2 capsules by mouth, once a day

Or write the first month's dose with your own 2-step prescription

Standard prescription for adult:
- Strattera 40 mg
- Quantity: 4
- Sig: one capsule by mouth, once a day
- Strattera 40 mg
- Quantity: 52
- Sig: 2 capsules by mouth, once a day

- Strattera capsules are available in 10-mg, 18-mg, 25-mg, 40-mg, and 60-mg strengths
- Initiate dose at approximately 0.5 mg/kg. Increase dose after a minimum of 3 days to a target daily dose of approximately 1.2 mg/kg
- For patients weighing over 70 kg and adults, initiate dose at 40 mg. Increase the dose after a minimum of 3 days to a target daily dose of 80 mg
- Maximum recommended total daily dose in patients should not exceed 1.4 mg/kg or 100 mg, whichever is less
- Proven effective with once- or twice-daily dosing
- Dosage adjustment is recommended for patients on concomitant strong CYP2D6 inhibitors

Please see full Prescribing Information provided by your Lilly Representative.

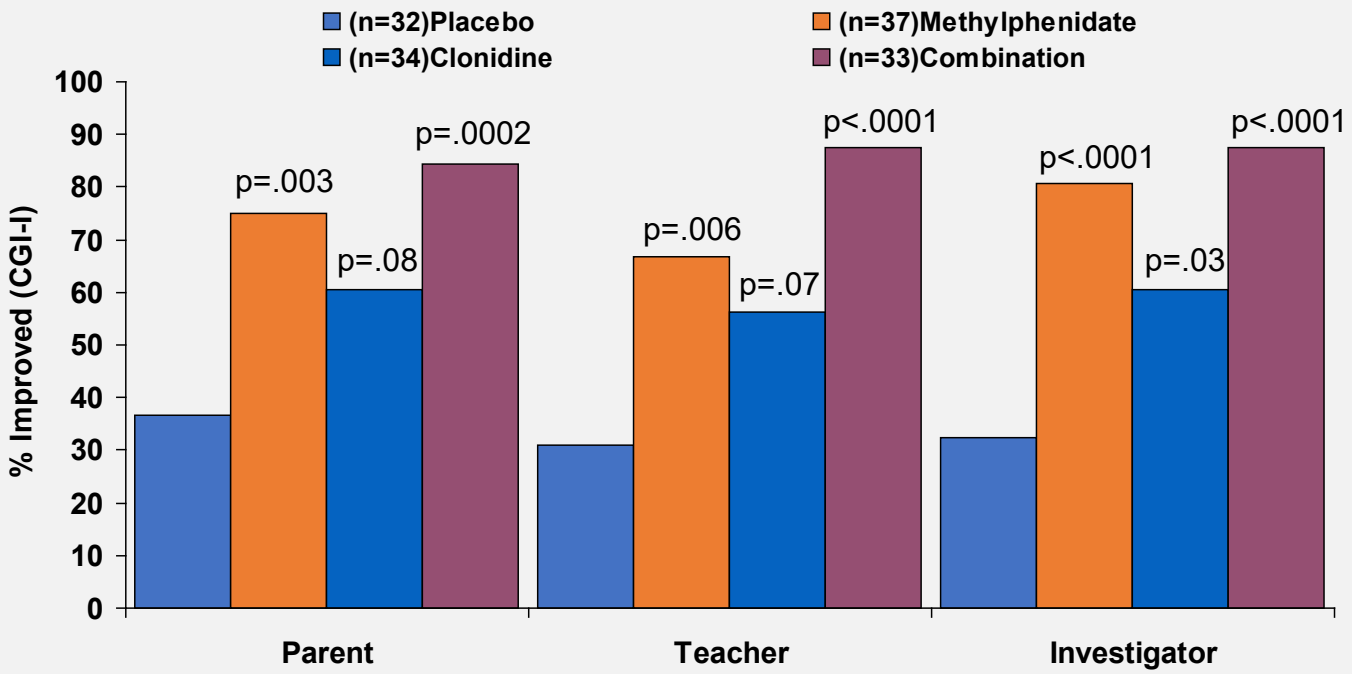
strattera® atomoxetine HCl

Lilly

Alpha Agonists

- Dosing: Tenex/Guanfacine- start at 0.5mg once or twice a day
- Catapres/Clonidine- start at 0.05mg once or twice a day
- Common AEs: sedation, lower BP- max for Clonidine 0.4mg daily (MUST taper when stopping)
- Better for hyperactivity/impulsivity than inattention- max for Guanfacine 6mg daily
- Intuniv start at 1mg daily- advance weekly or longer to max of 6mg per day
- Advantages
  - Sedating (sleep difficulties)
  - LA forms given once daily (Kapvay may need BID)
- Disadvantages
  - Must have reliable parent(s)
  - Generally less effective than stimulants

Clonidine Added to Stimulants to Treat ADHD: Efficacy



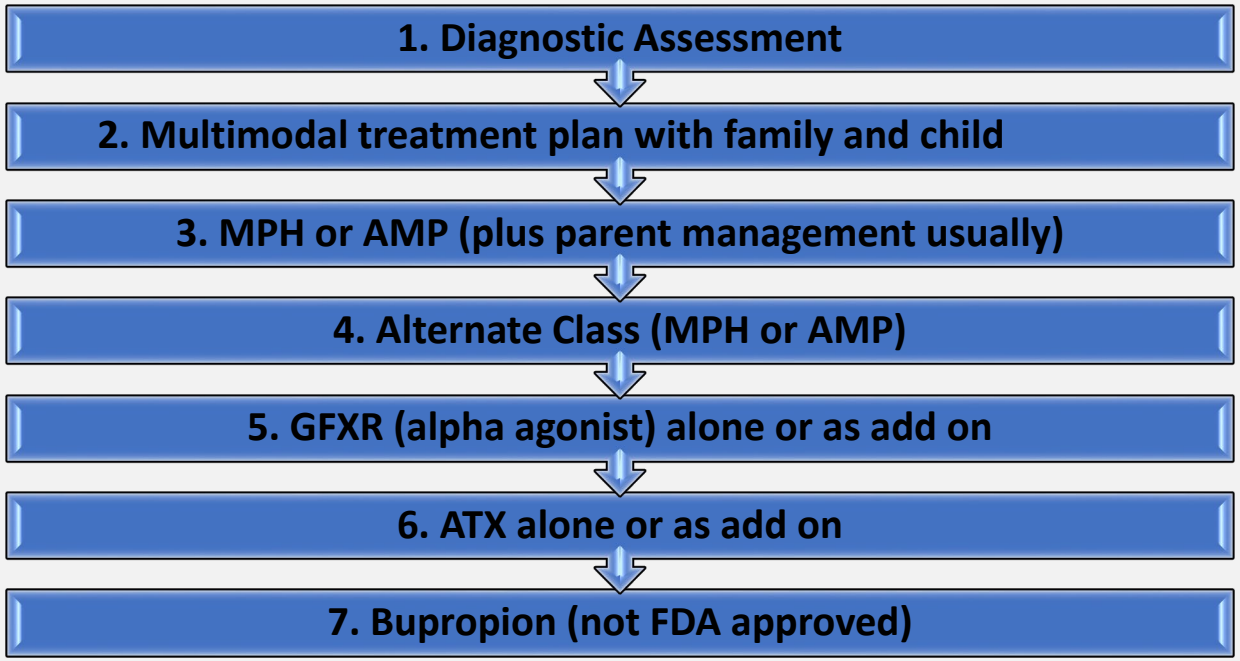
Clonidine mean daily dose: 0.25 mg (alone) and 0.28 mg (combination)
Methylphenidate mean daily dose: 25.7 mg (alone) and 26.1 mg (combination)

Tourette's Syndrome Study Group. Neurology 2002.

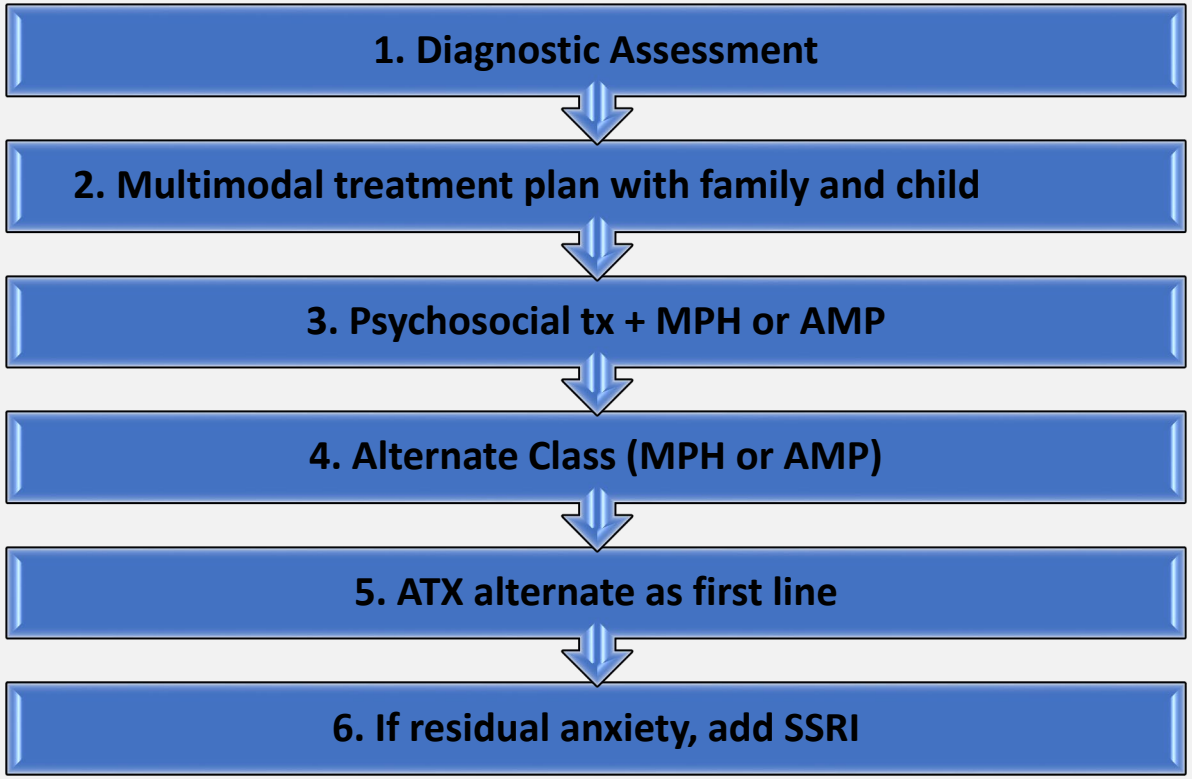
Medication Treatment Responsive Groups

- Children
- Teenagers
- Adults
- Preschoolers (Short et al . 2004, Greenhill et al., 2007)
- Individuals with Intellectual Handicaps (Pearson et al.2004)
- ADHD co-morbid with Other Diagnoses
  - Tourette's Disorder
  - Autistic Spectrum Disorder
  - Anxiety/Mood Disorder
  - Conduct Disorder
  - Oppositional Defiant Disorder
  - Substance Abuse Disorder

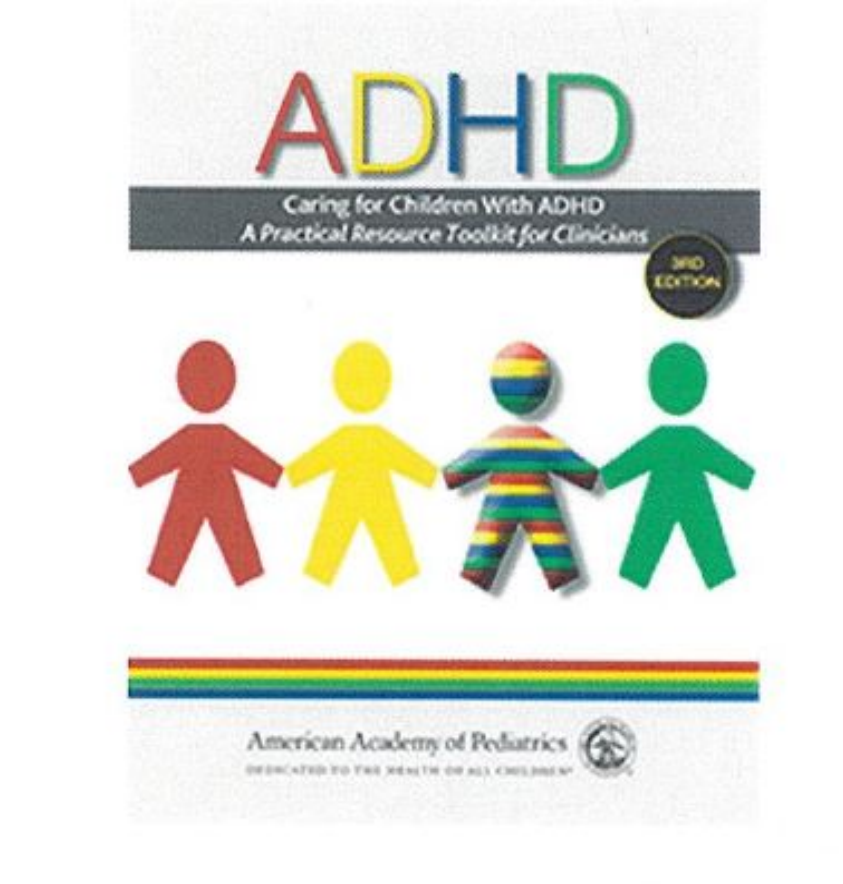
Garden Variety ADHD

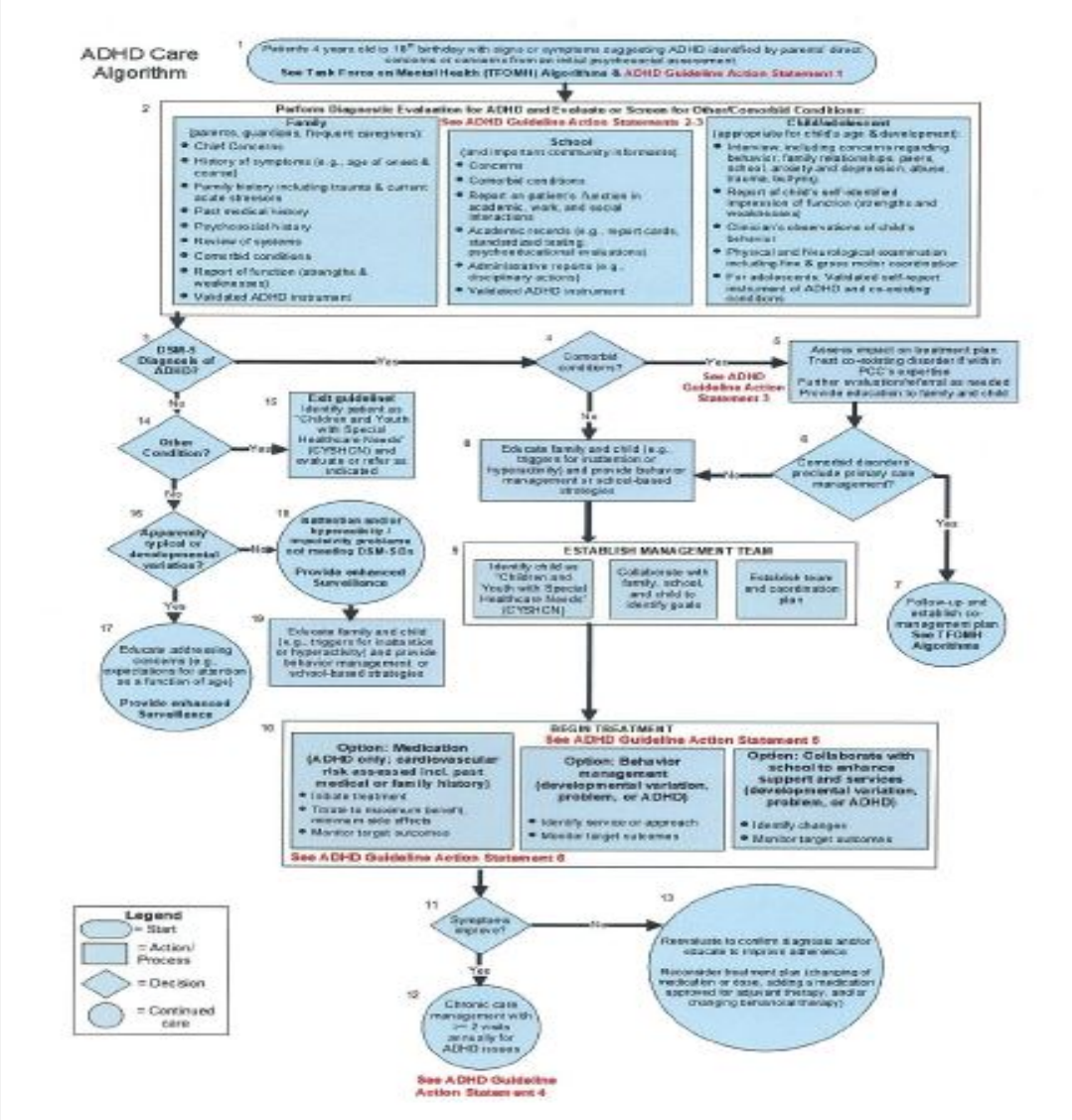


ADHD + Anxiety/Depression Comorbidities and ADHD



Toolkit Published by AAP 2020





Non-pharmacological Interventions

- Behavior therapy/parent training
- Social skills training if needed
- Educational interventions – 504 plan, IEP, co-teaching etc. Instructional modification
- Organizational skills training
- Peer tutoring
- Computer assisted instruction – targets attention and working memory- popular in research sector and commercially. Evidence not clear- reviewed by Rutledge 2012
- Homework focused interventions
- Dealing with co-morbid conditions

Principles of Behavior Therapy

- Positive reinforcement is much better than negative reinforcement
- Motivation can be improved with pairing preferred and non-preferred activities- work before play!
- Most of us thrive with structure and routine ADHD child needs lots of this!
- Tight collaboration with school- behavior plan, daily report card
- Avoid shaming and excessive punishment

Social Supports

- Support groups (e.g. CHADD)
- Online
  - www.teachingkidstolisten.com
  - www.Help4ADHD.org
- Books
  - 1-2-3 Magic (Tom Phelan)
  - Making the System Work for Your ADHD Child (Peter Jensen)
  - Taking Charge of ADHD: The Complete Authoritative Guide for Parents (Russell Barkley)
  - ADHD: What Every Parent Needs to Know (M Reiff

Treatment Take Homes

- Remember psychosocial treatments and school interventions!
- Titrate closely and relatively quickly
- Follow up every 3 months only after stable
- Use your algorithms
- Higher stimulant dose is usually the first step

- My thanks to Dr. J. Wallace at University of Rochester for the following accommodations menu

Accommodation Menu

Focus and Attention

- _____Seat in the front of the classroom
- _____Seat away from distractions (fish tank)
- _____Seat near quiet peers and away from disruptive peers
- _____Increase space between seats
- _____Private cue to stay on/return to task
- _____Involve student in discussions/activities
- _____Make instructions clear and brief
- _____Select teachers with energetic, engaging style
- _____Pair written and oral instructions
- _____Check to be sure assignments are copied correctly
- _____Break large assignments into parts with deadlines
- _____Make extra eye contact with student
- _____each in close proximity to student
- _____Consider need for smaller environment with more adult support

Accommodation Menu

Impulsivity and Hyperactivity

- ____Ignore minor impulsive behavior
- ____Keep student occupied and active
- ____Supervise closely during transitions
- ____Reprimand(s) should be brief and private if possible
- ____Seat near good role model
- ____Notice and reinforce positive behaviors
- ____Set up behavior contract with clear short-term goals
- ____Encourage hand-raising and waiting
- ____Rewards and consequences should be immediate
- ____Implement home/school reward token system
- ____Allow student to stand and move at times
- ____Provide movement breaks between seated activities
- ____Consider need for smaller environment with more adult support

Accommodation Menu

Organization and Planning

_____Use adults to support organization – teachers, parents, resource teachers

- _____Create “Homework Loop” to complete daily assignments
- _____Check to see that assignments are written down correctly
- _____Be sure correct books go home or consider extra copies
- _____Encourage parents to set up homework time and place and assistant
- _____Have teachers ask for completed assignments
- _____Empty and reorganize book bag and locker at least weekly
- _____Use colored dividers and folders
- _____Consider peer assistant for organization
- _____Use multi-sensory approaches for giving assignments and teaching
- _____Consider allowing tape recording of assignments and lessons
- _____Use consistent repetitive approach to getting organized
- _____Ask student to repeat instructions

Accommodation Menu

Academic Struggles

- ____Consider referral for testing for any learning concerns/disabilities
- ____Explore other possible impairing conditions (speech, hearing, learning disabilities)
- ____Use multi-sensory techniques in all phases of teaching
- ____Use games, songs and chants/raps for rote learning and memorization
- ____Accommodate weaknesses in learning – math, reading, foreign language
- ____Be aware that learning weaknesses worsen attentional problems and vice versa
- ____Schedule regular meetings/communication with parents about learning concerns
- ____Direct parents to practice skills with student
- ____Parents can consider private tutoring or after-school homework support
- ____Consider need for formal 504 accommodations or Special Education support
- ____Consider different levels of support (resource room, consult teacher, self-contained setting)
- ____Emphasize any areas of interest in academics content

New FDA Approved Stimulants

Trade Name	Generic Name	Available Forms	Dosing	Duration	Peak Effect	Age Indicated	Comments
ADHANSIA XR	Methylphenidate	Capsules: 25,35,45,55,70 and 85 mg; equivalent to 21.6 mg, 30.3 mg, 38.9, mg, 47.6 mg, 60.5 mg, and 73.5 mg of MPH free base	Start: 25 mg QD; increase by 10-15 mg weekly to MAX 85 mg in adolescents	16		6+ ADHD (including adults)	20IR:80ER Can be sprinl
COTEMPLA XR ODT	Methylphenidate	ODT: 8.6,17.3,25.9 mg	Start: 17.3 mg QD; increase 8.7-17.3 weekly to MAX 51.8 mg	8-12 hours	4-5h	6-17 yrs ADHD	Grape ODT/dissolva 25:75% IR/EI
JORNAY	Methylphenidate	20, 40, 60, 80, 100 mg caps equivalent to 17.4 mg, 34.8 mg, 52.2 mg, 69.6 mg, or 87.0 mg of methylphenidate free base	Start: 20 mg; increase by 20 mg weekly to MAX 100 mg	12-14 h with delayed onset		6+ ADHD (including adults)	Take at bedti delayed onse h), XR Can be opene sprinkled
EVEKEO	D, L-Amphetamine Sulfate (50:50)	Tablets: 5, 10 mg ODT: 5,10,15,20 mg	Start: 2.5 mg for <6; 5 mg QD-BID for 6+ MAX: 40 mg/d in BID-TID	4-6 hrs	2-3	3-17 ADHD; 6+ Narcolepsy 12+ Obesity	Approved preschool; C
MYDAYIS	Mixed Amphetamine Salts (3:1 d:l)	Capsules: 12.5, 25 ,37.5, 50mg	Start: 12.5 mg; increase by 12.5 mg weekly to MAX 25 mg 13-17; 50 mg 18+	14-16	7-10	13+ ADHD	3 beads: IR/E Can be opene sprinkled
ZENZEDI	D-amphetamine	Tablets : 2.5, 5,7.5, 10,15, 20 or 30 mg	Start: 2.5 mg for <6; 5 mg QD-BID for 6+ MAX: 40 mg <6; 60 mg>6 BID-TID	4-6 hours	3	3-16 ADHD 6-11 Narcolepsy 12+ Obesity	

FDA Approved Medications for ADHD

Stimulant — Methylphenidate Family

Trade Name	Generic Name	Available Forms	Dosing	Duration	Peak Effect	Age Indicated	Side Effects	Comments
APTENSIO XR	Methylphenidate	Capsule (can be sprinkled): 10, 15, 20, 30, 40, 50, 60 mg	Start at 10 mg, increase by 10 mg qwk until good control. MDD 60 mg	8-12 hours	1-2 hours*	6+	**Common:** Loss of appetite, sleep disturbance, nervousness, nausea, vomiting, abdominal pain, weight loss, dizziness, headaches, changes in heart rate and blood pressure (usually elevation of both), rebound ADHD. **Less common:** palpitations, skin rashes and itching (usually with patch), mood changes, irritability. **Rare:** growth retardation, psychotic symptoms, myocardial infarction, drug dependence, severe depression on withdrawal of drug. **Monitor:** Ht, Wt, Pulse and BP	40% released early; 60% later
CONCERTA	Methylphenidate	Tablets (noncrushable-OROS):18, 27, 36, 54 mg	Start at 18mg qAM and increase each wk until good control. MDD 72 mg	8-12 hours	6-8 hours	6+		22:78 IR:ER, slower onset:
DAYTRANA	Methylphenidate (patch)	Patch: 10, 15, 20, 30 mg	Start with 10mg patch and increase by 5-10 mg each wk until good control. MDD 30 mg. **Note:** Patch to be placed once a day in the AM and removed 9 hrs later. Apply 2 hrs before desired effect.	12 hours	Effective ~2 hrs after applied; for ~3 more hours after removed	6+		Higher plasma levels than oral methylphenidate
FOCALIN	Dexmethylphenidate	Tablets (scored): 2.5, 5,10 mg	Start with 2.5 mg 1-2 times per day and increase by 2.5 mg each week until good control. May need 3rd reduced dose in PM. MDD 30 mg	4 hours	2-3 hours	6+		
FOCALIN XR	Dexmethylphenidate	Capsules (can be sprinkled): 5, 10, 20 mg	Start with 5 mg 1 x per day; increase by 5 mg each week until good control. May need noon dose. MDD 30 mg	8-12 hours	3-4 hours	6+		50:50 IR:ER, dose 50% other MPH preps
METADATE CD	Methylphenidate	Capsule (can be sprinkled): 10, 20, 30, 40, 50, 60 mg extended release	Start at 20 mg qAM and increase by 10-20 mg each week until good control. MDD 60 mg	6-8 hours	3-5 hours	6+		30% released early; 70% later
METHYLIN	Methylphenidate	Oral solution: 5mg/10 ml; 10 mg/10 ml. Tablets (chewable): 2.5, 5, 10 mg. Tablet (scored): 5, 10, 20 mg	Start with 5 mg twice daily (before breakfast and lunch) with increase of 5-10 mg wkly until good control. May need 3rd reduced dose in PM. MDD 60 mg	4 hours	2-3 hours	6+		
QUILLICHEWER	Methylphenidate hydrochloride	Tablets (chewable): 20, 30, 40 mg (20 & 30 scored)	Start at 10 mg, increase by 10-20 mg qwk until good control. MDD 60 mg.	8-12 hours	1-2 hours*	6+		
QUILLIVANT XR	Methylphenidate hydrochloride	Oral solution: 25 mg/5 cc extended release	Start at 20mg qAM and increase by 10mg each week until good control. MDD 60 mg	8-12 hours	2- 4.5 hours	6+		
RITALIN	Methylphenidate	Tablets (scored): 5, 10, 20 mg	Start with 5mg twice daily (before breakfast and lunch) with increase of 5-10mg wkly until good control. May need 3rd reduced dose in PM. MDD 60 mg. Under age 6, start with 2.5 mg bid, usual effective dose: ~ 0.7mg / kg total daily dose	4 hours	2-3 hours	6+		50:50 IR:ER
RITALIN LA	Methylphenidate	Capsule (can be sprinkled): 10, 20, 30, 40 mg	Capsule cannot be split (but CAN be sprinkled) so best to titrate with short-acting Ritalin and then switch to Ritalin LA. MDD: 60 mg	6-8 hours	3-5 hours	6+		

*Extrapolation from PDR graph

Hargrave 2016 (Revision of REACH Institute/Peter Jensen's Table: "Medications for ADHD")