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Pharmacotherapy for Adult Attention Deficit/Hyperactivity Disorder

Attention Deficit/Hyperactivity Disorder (ADHD) is a childhood-onset neuropsychiatric condition. At age 25 approximately 15% of affected individuals will continue to meet full DSM-IV-TR criteria for ADHD while about 65% will have symptoms in some degree of partial remission.[1] These factors lead to a net ADHD prevalence rate of about 4% in the adult population.[2]

Effective treatment of ADHD requires a comprehensive approach. This guideline addresses only the pharmacological aspects of ADHD treatment. Psychostimulants, such as methylphenidate, dextroamphetamine, and mixed amphetamine salts are the most effective and best studied medications for ADHD in patients of all ages.[3] These agents are generally equally effective and primarily differ in the release formulation (i.e. short-acting versus long-acting).

Abuse potential of psychostimulants is low but may occur for performance enhancement or weight loss.[4] Long-acting formulations have a decreased potential for abuse.[5]

Patients who fail to respond, do not tolerate, or have contraindications to psychostimulants should be considered for non-stimulants such as bupropion, clonidine, guanfacine, or atomoxetine (non-formulary). All of these agents may be used as monotherapy or in combination with psychostimulants for patients with only a partial response.

Monitoring of ADHD treatment should focus on functional improvement and side effects. Common side effects for psychostimulants include insomnia, motor tics, anxiety, irritability, overstimulation, tremor, dizziness, appetite suppression/weight loss, and sweating. Dangerous side effects include psychosis (particularly with parenteral abuse or in predisposed patients), activation of hypomania or mania (particularly in predisposed patients), tachycardia, hypertension, and cardiovascular adverse effects in patients with a prior history of cardiovascular disease.[6]

Mood, anxiety, and substance use disorders exist in up to 90% of adults with ADHD making their presence the rule rather than the exception.[4] Successful treatment of ADHD often depends on the management of these comorbid conditions. In cases of concurrent addiction (particularly cocaine or methamphetamine) psychostimulants do not appear to worsen substance use however they also do not appear to be as effective.[7, 8]

When concerns of ongoing substance use and/or diversion of prescribed medication are present, clinicians should employ standardized assessment scales, use of long-acting formulations of stimulants or non-stimulant medications, urine toxicology monitoring, and more frequent assessments with shorter prescription durations. Patients should also be referred for substance abuse treatment.

Psychostimulants

Drug	METHYLPHENIDATE			DEXTROAMPHETAMINE		MIXED AMPHETAMINE SALTS	
Brand	Ritalin, Methylin	Ritalin SR, Metadate ER, Methylin ER	Concerta	DextroStat, Dexedrine	Dexedrine Spansule	Adderall	Adderall XR
Generic	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dosing Sizes	5, 10, 20 mg tabs	20 mg tab	18, 27, 36, 54 mg tabs	5, 10 mg tabs	5, 10, 15 mg bead-filled caps	5, 7.5, 10, 12.5, 15, 20, 30 mg tabs	5, 10, 15, 20, 25, 30 mg caps
Max Dose	60mg/day	60mg/day	72mg/day	40 mg/day	40 mg/day	40 mg/day	30 mg/day
Dosing	BID-TID	QD	QD	QD-BID	QD	BID	QD
Release	IR	ER/SR	~20% IR + ~80% ER (OROS)	IR	40% IR + 60% SR	IR	ER (~50% IR + ~50% released 4 hrs later)
Onset/ pharmacokinetics	T _{max} 1-3 hrs		T _{max} 6-8 hrs	T _{max} 1-3 hrs	T _{max} 8 hrs	T _{max} 3 hrs	T _{max} 7 hrs
Duration of Action	2-4 hrs	4-6 hrs	12 hrs	3-6 hrs	8 hrs	3-6 hrs	8 hrs
Crush?	Yes Best if given before meals	No Swallow whole	No Swallow whole	Yes	No Do not chew beads in capsule	Yes	No Sprinkle on applesauce, swallow without chewing
Pregnancy Category	C	C	C	C	C	C	C

Non-Stimulants

Drug	ATOMOXETINE	BUPROPION			CLONIDINE		GUANFACINE
Brand	Strattera	Wellbutrin	Wellbutrin SR	Wellbutrin XL	Catapres	Catapres-TTS	Tenex
Generic available	No	Yes	Yes	Yes	Yes	Yes	Yes
Dosing Sizes	10, 18, 25, 40, 60, 80, 100 mg caps	75, 100 mg tab	100, 150, 200 mg tab	150, 300 mg tab	0.1, 0.2, 0.3 mg tab	0.1, 0.2, 0.3 mg patches	1,2, mg tab
Max Dose	100 mg/day or 1.4 mg/kg/day	450mg/day	400mg/day	450mg/day	2.4mg/day	0.6mg/day every 7 days	4mg/day
Dosing	QD-BID	TID	BID	Daily	Daily-QID	Once every 7 days	Daily
Release formulation	N/A	IR	SR	ER	IR	Transdermal Patch	IR
Onset/ pharmacokinetics	Initial response is 1 week for ADHD; T _{max} 1-2 hrs	T _{max} 2 hrs	T _{max} 3 hrs	T _{max} 5 hrs	2-4hrs; T _{max} 3-5hrs	2-3 days	T _{max} 3 hrs
Duration of Action	24 hrs	8 hrs	12 hrs	24 hrs	Up to 8 hrs	Up to 8 hrs after patch removal	
Crush?	No	Yes	No	No	Yes	N/A	Yes
Pregnancy Category	C	C	C	C	C	C	B

Abbreviations: IR = immediate release, OROS = osmotic extended release system, ER = extended release, SR = sustained release

Formulary Status (updated 12/16/2011)

Drug		Formulary			
Generic	Brand	CBHS	CHN/HSF	Medi-Cal	SFHP†
Methylphenidate IR	Ritalin, Methylin	F	F	RF (ages 4-16)	RF (ages 5-24)
Methylphenidate SR	Ritalin SR, Metadate ER, Methylin ER	F	F _{psych}	NF	RF (ages 5-24) Methylin ER only
Methylphenidate OROS	Concerta	F	F _{psych}	RF (ages 4-16)‡	RF (ages 5-24)
Dextroamphetamine IR	Dextrostat, Dexedrine	F	F	RF (ages 4-16)	RF (ages 5-24)
Dextroamphetamine SR	Dexedrine Spansule	F	F _{psych}	NF	RF (ages 5-24)
Mixed Amphetamine Salts IR	Adderall	F	F	RF (ages 4-16)	RF (ages 5-24)
Mixed Amphetamine Salts XR	Adderall XR	F	F _{psych}	RF (ages 4-16)	RF (ages 5-24)
Atomoxetine	Strattera	NF	NF	NF	F
Bupropion IR	Wellbutrin	F	F	F	F
Bupropion SR	Wellbutrin SR	F	NF	F	F
Bupropion XL	Wellbutrin XL	F	F	F	F
Clonidine	Catapres	F	F	F	F
Clonidine Patch	Catapres-TTS	F	F	F	PAR
Guanfacine	Tenex	F	NF	F	F

Abbreviations: F = formulary, F_{psych} = first Rx by psychiatrist, RF = restricted formulary, NF = non-formulary, PAR = prior authorization required

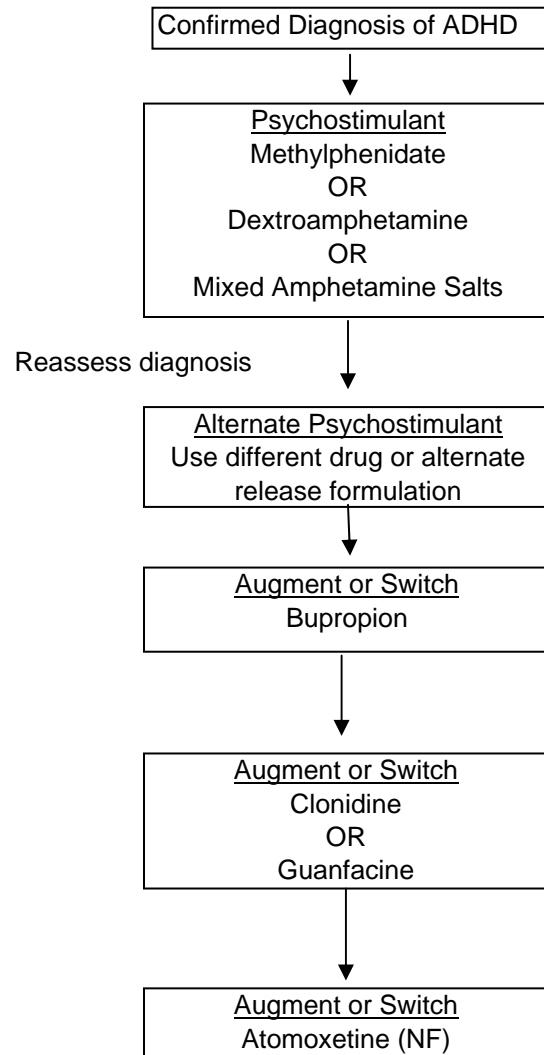
† New start of psychostimulants for patients 25 and older require consultation from a psychiatrist. Continuation of treatment in adults does not require consultation.

‡ Requires claim for this drug submitted before 12/1/04 and at least every 100 days

References:

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San Francisco Community Behavioral Health Services Pharmacotherapy for ADHD



Treatment Considerations:

- Consider starting with bupropion in patients with a contraindication or previous intolerance to psychostimulants
- Concurrent substance abuse disorders and psychiatric illnesses should be addressed prior to initiating treatment for ADHD
- Use psychostimulants with caution in patients with bipolar or psychotic disorders
- Consider using a long-acting formulation for patients with a history of substance abuse or who require once daily dosing
- The effective psychostimulant dose may be higher than published dosage range depending on patient tolerability and response

MEDICATIONS USED IN ADULT ATTENTION DEFICIT AND HYPERACTIVITY DISORDER (ADHD):

MEDICATION	BRAND NAME	RANGE	SIDE EFFECTS
DEXTROAMPHETAMINE[‡] METHYLPHENIDATE[‡] DEXTROAMPHETAMINE/ AMPHETAMINE[‡]	Dexedrine Spansules Dextrostat Ritalin Ritalin SR Concerta Adderall Adderall XR	2.5-40 mg 5-40 mg 5-40 mg 5-60 mg 20-60 mg 18-54 mg 2.5-40 mg 10-30 mg	Relatively Common: Nervousness, irritability, restlessness, insomnia, decreased appetite, rapid pulse, increased blood pressure, dry mouth, increased sweating Less Common: Irregular heart beat; nausea, vomiting, constipation or diarrhea; abnormal dreams, headache, psychosis (such as hearing voices and paranoia) Rare: Chest pain, unusually high fever, skin rash, uncontrolled movements of head, arms, and legs
BUPROPION	Wellbutrin Wellbutrin SR Wellbutrin XL	200-450 mg 150-400 mg 150-450 mg	Relatively Common: Headache, insomnia, dizziness, dry mouth, weight loss, nausea, increased heart rate Less Common: Constipation, abdominal pain, diarrhea, flatulence, irregular heartbeat, chest pain, agitation, confusion, nervousness, drowsiness, itchiness Rare: seizure, liver dysfunction, rash, urinary retention
CLONIDINE	Catapres Catapres TTS	0.1-2.4 mg 0.1-0.6 mg	Relatively Common: Drowsiness, headache, dry mouth, constipation, fatigue/weakness, dizziness, sedation, sleep disturbances, rash/itchiness/redness (with transdermal patch) Less Common: Nervousness, sexual dysfunction, decreased heart beat Rare: Muscle weakness, low platelets, liver damage
GUANFACINE	Tenex	1-4 mg	Relatively Common: Dry mouth, headache, somnolence, dizziness, fatigue, insomnia, vomiting, nausea, weakness, weight gain Less Common: Stomach discomfort, increase blood pressure, asthma, chest pain, irregular heart beat Rare: Agitation, rash, seizure, blurred vision, confusion
ATOMOXETINE	Strattera	40-100 mg	Relatively Common: Headache, abdominal pain, insomnia, vomiting, appetite decreased, nausea, cough Less Common: irregular heartbeat, systolic blood pressure increased, fatigue, irritability, dizziness, abnormal dreams, sleep, sexual dysfunction, weight loss, diarrhea Rare: Allergy, rash, liver damage, seizure

Ranges represent usual therapeutic doses for healthy adults. Some patients may require higher or lower doses, depending on side effects or response.

[‡]These medications are considered “schedule II controlled substances” under the Controlled Substance Act, which have high potential for abuse which may lead to severe psychological or physical dependence. Schedule II controlled substances must be ordered via a hardcopy prescription and are not refillable. Due to their potential for abuse and diversion, close monitoring of proper use and the use of illicit substances may be needed.

For any serious side effects contact your doctor immediately or seek emergency care if your doctor is not available.