

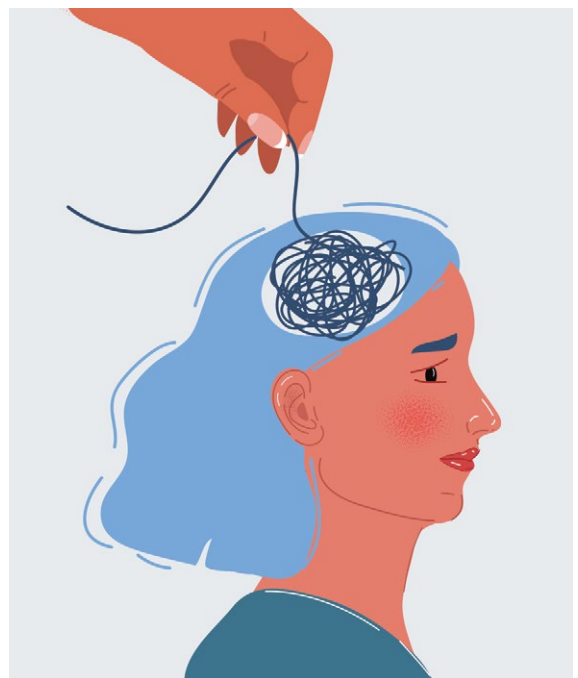
# Adult ADHD: A sensible approach to diagnosis and treatment

These steps can help ensure accurate diagnosis and optimal outcomes

**A**ttention-deficit/hyperactivity disorder (ADHD) is common, with an estimated worldwide prevalence of 5.29% among children and adolescents and 2.5% among adults.<sup>1</sup> DSM-5-TR classifies ADHD as a neurodevelopmental disorder, “a group of conditions with onset in the developmental period [that] typically manifest early in development, often before the child enters school.”<sup>2</sup> Because of the expectation that ADHD symptoms emerge early in development, the diagnostic criteria specify that symptoms must have been present prior to age 12 to qualify as ADHD. However, recent years have shown a significant increase in the number of patients being diagnosed with ADHD for the first time in adulthood. One study found that the diagnosis of ADHD among adults in the United States doubled between 2007 and 2016.<sup>3</sup>

First-line treatment for ADHD is the stimulants methylphenidate and amphetamine/dextroamphetamine. In the United States, these medications are classified as Schedule II controlled substances, indicating a high risk for abuse. However, just as ADHD diagnoses among adults have increased, so have prescriptions for stimulants. For example, Olfson et al<sup>4</sup> found that stimulant prescriptions among young adults increased by a factor of 10 between 1994 and 2009.

The increased prevalence of adult patients diagnosed with ADHD and taking stimulants frequently places clinicians in a position to consider the validity of existing diagnoses and evaluate new patients with ADHD-related concerns. In this



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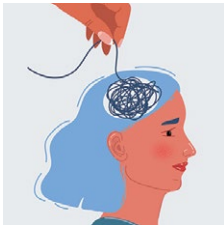
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## Adult ADHD

### Clinical Point

Retrospectively diagnosing a developmental condition in adults is often biased by the patient's current functioning

Table 1

## DSM-5-TR criteria for attention-deficit/hyperactivity disorder

A. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):	
1. Inattention: ≥6 symptoms persisting ≥6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities (Note: For those age ≥17, ≥5 symptoms are required)	a. Careless mistakes
	b. Difficulty sustaining attention
	c. Does not listen when spoken to directly
	d. Does not follow through on instructions
	e. Difficulty organizing tasks
	f. Avoids tasks with sustained mental effort
	g. Loses things
	h. Easily distracted
	i. Forgetful
2. Hyperactivity and impulsivity: ≥6 symptoms persisting ≥6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities (Note: For those age ≥17, ≥5 symptoms are required)	a. Fidgets
	b. Leaves seat
	c. Inappropriate running or restlessness
	d. Unable to engage in leisure quietly
	e. Uncomfortable being still
	f. Talks excessively
	g. Completes others' sentences
	h. Difficulty waiting turn
	i. Interrupts others
B. Several inattentive or hyperactive-impulsive symptoms were present prior to age 12	
C. Several inattentive or hyperactive-impulsive symptoms are present in ≥2 settings	
D. There is clear evidence that the symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning	
E. The symptoms do not occur exclusively during the course of a psychotic disorder and are not better explained by another mental disorder	
<b>Source:</b> American Psychiatric Association. <i>Diagnostic and Statistical Manual of Mental Disorders</i> . 5th ed, text revision. American Psychiatric Association; 2022:68-69.	

article, we review some of the challenges associated with diagnosing ADHD in adults, discuss the risks of stimulant treatment, and present a practical approach to the diagnosis and treatment of ADHD in adults.

### Challenges in diagnosis

DSM-5-TR diagnostic criteria for ADHD are summarized in *Table 1*. Establishing a diagnosis of adult ADHD can be challenging. As with many psychiatric conditions, symptoms of ADHD are highly subjective. Retrospectively diagnosing a developmental condition in adults is often biased by the patient's current functioning.<sup>5</sup> ADHD has a high heritability and adults may inquire about the diagnosis if their children are diagnosed with ADHD.<sup>6</sup> Some experts have

cautioned that clinicians must be careful in diagnosing ADHD in adults.<sup>7</sup> Just as there are risks associated with underdiagnosing ADHD, there are risks associated with overdiagnosis. Overdiagnosis may medicalize normal variants in the population and lead to unnecessary treatment and a misappropriation of limited medical resources.<sup>8</sup> Many false positive cases of late-onset ADHD may be attributable to nonimpairing cognitive fluctuations.<sup>9</sup>

Poor diagnostic practices can impede accuracy in establishing the presence or absence of ADHD. Unfortunately, methods of diagnosing adult ADHD have been shown to vary widely in terms of information sources, diagnostic instruments used, symptom threshold, and whether functional impairment is a requirement for

Table 2

## Risks associated with stimulant use

Category	Risks
Misuse	Abuse, addiction, diversion
Psychiatric	Anxiety, irritability, insomnia, mania, psychosis
Cardiovascular	Hypertension, tachycardia, arrhythmia, stroke, transient ischemic attack
Other medical	Appetite suppression, dry mouth, nausea, stunted growth, neonatal morbidity

Source: References 23-40

diagnosis.<sup>10</sup> A common practice in diagnosing adult ADHD involves asking patients to complete self-report questionnaires that list symptoms of ADHD, such as the Adult ADHD Self-Report Scale developed by the World Health Organization.<sup>11</sup> However, self-reports of ADHD in adults are less reliable than informant reports, and some young adults without ADHD overreport symptoms.<sup>12,13</sup> Symptom checklists are particularly susceptible to faking, which lessens their diagnostic value.<sup>14</sup>

The possibility of malingered symptoms of ADHD further increases the diagnostic difficulty. College students may be particularly susceptible to overreporting ADHD symptoms in order to obtain academic accommodations or stimulants in the hopes of improving school performance.<sup>15</sup> One study found that 25% to 48% of college students self-referred for ADHD evaluations exaggerated their symptoms.<sup>16</sup> In another study, 31% of adults failed the Word Memory Test, which suggests noncredible performance in their ADHD evaluation.<sup>17</sup> College students can successfully feign ADHD symptoms in both self-reported symptoms and computer-based tests of attention.<sup>18</sup> Harrison et al<sup>19</sup> summarized many of these concerns in their 2007 study of ADHD malingering, noting the “almost perfect ability of the Faking group to choose items ... that correspond to the DSM-IV symptoms, and to report these at levels even higher than persons with diagnosed ADHD.” They suggested “Clinicians should be suspicious of students or young adults presenting for a first-time diagnosis who rate themselves as being significantly symptomatic, yet have managed to achieve well in school and other life activities.”<sup>19</sup>

Another challenge in correctly diagnosing adult ADHD is identifying other conditions

that may impair attention.<sup>20</sup> Psychiatric conditions that may impair concentration include anxiety disorders, chronic stress, posttraumatic stress disorder, recent trauma, major depressive disorder (MDD), and bipolar disorder (BD). Undiagnosed learning disorders may present like ADHD. Focus can be negatively affected by sleep disorders such as sleep apnea, restless leg syndrome, or delayed sleep phase-onset disorder. Marijuana, cocaine, 3,4-methylenedioxymethamphetamine (MDMA; “ecstasy”), caffeine, or prescription medications such as anticholinergics can also impair attention. Medical conditions that can present with attentional or executive functioning deficits include seizures, Lyme disease, HIV, encephalopathy, hypothyroidism, and “chemo brain.”<sup>21</sup> Environmental factors such as age-related cognitive decline, sleep deprivation, inflammation, obesity, air pollution, chemical exposure, and excessive use of digital media may also produce symptoms similar to ADHD. Two studies of adult-onset ADHD concluded that 93% to 95% of cases were better explained by other conditions such as sleep disorders, substance use disorders, or another psychiatric disorder.<sup>22</sup>

### Risks associated with treatment

With or without an accurate ADHD diagnosis, prescribing stimulants presents certain risks (Table 2<sup>23-40</sup>). One of the more well-known risks of stimulants is addiction or misuse.<sup>23</sup> An estimated 5 million American adults misused prescription stimulants in 2016.<sup>24</sup> Despite stimulants’ status as controlled substances, long-term concurrent use of stimulants with opioids is common among adults with ADHD.<sup>25</sup> College students are particularly susceptible to misusing

### Clinical Point

The possibility of malingered symptoms further increases the diagnostic difficulty



## Adult ADHD

### Clinical Point

**Stimulants increase the risk for anxiety, can worsen irritability and insomnia, and can trigger manic episodes**

Table 3

## Diagnosing attention-deficit/hyperactivity disorder in adults

1. Rule out other disorders that may present similar to ADHD (ie, MDD or GAD)
2. Take a careful developmental history (symptoms prior to age 12)
3. Obtain information from collateral sources (parents, school records)
4. Assess for functional impairment (academic performance, work promotion, relationships)

GAD: generalized anxiety disorder; MDD: major depressive disorder

or diverting stimulants, often to improve their academic performance.<sup>26</sup> At 1 university, 22% of students had misused stimulants in the past year.<sup>27</sup> Prescribing short-acting stimulants (rather than extended-release formulations) increases the likelihood of misuse.<sup>28</sup> Patients prescribed stimulants begin to receive requests to divert their medications to others as early as elementary school, and by college more than one-third of those taking stimulants have been asked to give, sell, or trade their medications.<sup>29</sup> Diversion of stimulants by students with ADHD is prevalent, with 62% of patients engaging in diversion during their lifetime.<sup>15</sup> Diverted stimulants can come from family members, black market sources, or deceived clinicians.<sup>30</sup> Although students' stimulant misuse/diversion often is academically motivated, nonmedical use of psychostimulants does not appear to have a statistically significant effect on improving grade point average.<sup>31</sup> Despite a negligible impact on grades, most students who take stimulants identify their effect as strongly positive, producing a situation in which misusers of stimulants have little motivation to stop.<sup>32</sup> While some patients might ask for a stimulant prescription with the rationale that liking the effects proves they have ADHD, this is inappropriate because most individuals like the effects of stimulant medications.<sup>33</sup>

The use of stimulants increases the risk for several adverse psychiatric outcomes. Stimulants increase the risk of anxiety, so exercise caution when prescribing to patients with a comorbid anxiety disorder.<sup>34</sup> Stimulants can also worsen irritability and insomnia, 2 issues common among patients with ADHD.<sup>32</sup> Use of stimulant medications can trigger manic episodes. Viktorin et al<sup>35</sup> found a >6-fold increase in manic episodes among patients with BD receiving methylphenidate monotherapy compared to those

receiving a combination of methylphenidate and a mood stabilizer.<sup>35</sup> The use of methylphenidate and amphetamine can lead to new-onset psychosis (or exacerbation of pre-existing psychotic illness); amphetamine use is associated with a higher risk of psychosis than methylphenidate.<sup>36</sup>

General medical adverse effects are also possible with stimulant use. Stimulants' adverse effect profiles include appetite suppression, dry mouth, and nausea. Long-term use poses a risk for stunting growth in children.<sup>1</sup> Using stimulants during pregnancy is associated with higher risk for neonatal morbidity, including preterm birth, CNS-related disorders, and seizures.<sup>37</sup> Stimulants can raise blood pressure and increase heart rate. Serious cardiovascular events associated with stimulant use include ventricular arrhythmias, strokes, and transient ischemic attacks.<sup>38</sup>

Nonstimulant ADHD treatments are less risky than stimulants but still require monitoring for common adverse effects. Atomoxetine has been associated with sedation, growth retardation (in children), and in severe cases, liver injury or suicidal ideation.<sup>39</sup> Bupropion (commonly used off-label for ADHD) can lower the seizure threshold and cause irritability, anorexia, and insomnia.<sup>39</sup> Viloxazine, a newer agent, can cause hypertension, increased heart rate, nausea, drowsiness, headache, and insomnia.<sup>40</sup>

### Sensible diagnosing

Given the challenges in accurately diagnosing ADHD in adults, we present a sensible approach to making the diagnosis (*Table 3*). The first step is to rule out other conditions that might better explain the patient's symptoms. A thorough clinical interview (including a psychiatric review

**Table 4**

## Conditions that present with ADHD-like symptoms

Psychiatric	Substances	Sleep	Medical	Environmental
MDD	Marijuana	Sleep deprivation	Seizures	Air pollution
GAD	Cocaine	Sleep apnea	Lyme disease	Chemical exposure
PTSD	MDMA (“ecstasy”)	Restless leg syndrome	HIV	Excessive digital media use
Bipolar disorder	Caffeine	Delayed sleep phase-onset disorder	Delirium	
Schizophrenia	Anticholinergics		Hypothyroidism	
Neurocognitive disorders			“Chemo brain”	
Age-related cognitive decline			Obesity	
Learning disorders			Inflammation	

ADHD: attention-deficit/hyperactivity disorder; GAD: generalized anxiety disorder; MDD: major depressive disorder; MDMA: 3,4-methylenedioxy-methamphetamine; PTSD: posttraumatic stress disorder

Source: References 20-22,41,42

of symptoms) is the cornerstone of an initial diagnostic assessment. The use of validated screening questionnaires such as the Patient Health Questionnaire-9 and General Anxiety Disorder-7 may also provide information regarding psychiatric conditions that require additional evaluation.

Some of the most common conditions we see mistaken for ADHD are MDD, generalized anxiety disorder (GAD), and BD. In DSM-5-TR, 1 of the diagnostic criteria for MDD is “diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).”<sup>41</sup> Similarly, criteria for GAD include “difficulty concentrating.”<sup>42</sup> DSM-5-TR also includes distractibility as one of the criteria for mania/hypomania. *Table 4*<sup>20-22,41,42</sup> lists other psychiatric, substance-related, medical, and environmental conditions that can produce ADHD-like symptoms. Referring to some medical and environmental explanations for inattention, Aiken<sup>22</sup> pointed out, “Patients who suffer from these problems might ask their doctor for a stimulant, but none of those syndromes require a psychopharmacologic approach.” ADHD can be comorbid with other psychiatric conditions, so the presence of another psychiatric illness does not automatically rule out ADHD. If alternative psychiatric diagnoses have been identified, these can be discussed with the patient and treatment offered that targets the specified condition.

Once alternative explanations have been ruled out, focus on the patient’s developmental history. DSM-5-TR conceptualizes

ADHD as a neurodevelopmental disorder, meaning it is expected to emerge early in life. Whereas previous editions of DSM specified that ADHD symptoms must be present before age 7, DSM-5 modified this age threshold to before age 12.<sup>1</sup> This necessitates taking a careful life history in order to understand the presence or absence of symptoms at earlier developmental stages.<sup>5</sup> ADHD should be verified by symptoms apparent in childhood and present across the lifespan.<sup>15</sup>

While this retrospective history is necessary, histories that rely on self-report alone are often unreliable. Collateral sources of information are generally more reliable when assessing for ADHD symptoms.<sup>13</sup> Third-party sources can help confirm that any impairment is best attributed to ADHD rather than to another condition.<sup>15</sup> Unfortunately, the difficulty of obtaining collateral information means it is often neglected, even in the literature.<sup>10</sup> A parent is the ideal informant for gathering collateral information regarding a patient’s functioning in childhood.<sup>5</sup> Suggested best practices also include obtaining collateral information from interviews with significant others, behavioral questionnaires completed by parents (for current and childhood symptoms), review of school records, and consideration of intellectual and achievement testing.<sup>43</sup> If psychological testing is pursued, include validity testing to detect feigned symptoms.<sup>18,44</sup>

When evaluating for ADHD, assess not only for the presence of symptoms, but also

### Clinical Point

**Assess not only for the presence of ADHD symptoms but also if these symptoms produce significant functional impairment**



Adult ADHD

### Clinical Point

As a general rule, long-acting stimulant formulations are preferred over short-acting formulations

Table 5

## Treating attention-deficit/hyperactivity disorder in adults

- |  |
|--|
| 1. Rule out comorbidities that stimulants could worsen (ie, cardiovascular)                |
| 2. Preferentially use extended-release stimulant formulations (and consider nonstimulants) |
| 3. Incorporate planned medication holidays (skip weekends)                                 |
| 4. Include nonpharmacologic interventions (organization, planning, study skills)           |

if these symptoms produce significant functional impairment.<sup>13,15</sup> Impairments in daily functioning can include impaired school participation, social participation, quality of relationships, family conflict, family activities, family functioning, and emotional functioning.<sup>45</sup> Some symptoms may affect functioning in an adult's life differently than they did during childhood, from missed work appointments to being late picking up kids from school. Research has shown that the correlation between the number of symptoms and functional impairment is weak, which means someone could experience all of the symptoms of ADHD without experiencing functional impairment.<sup>45</sup> To make an accurate diagnosis, it is therefore important to clearly establish both the number of symptoms the patient is experiencing and whether these symptoms are clearly linked to functional impairments.<sup>10</sup>

### Sensible treatment

Once a diagnosis of ADHD has been clearly established, clinicians need to consider how best to treat the condition (*Table 5*). Stimulants are generally considered first-line treatment for ADHD. In randomized clinical trials, they showed significant efficacy; for example, one study of 146 adults with ADHD found a 76% improvement with methylphenidate compared to 19% for the placebo group.<sup>46</sup> Before starting a stimulant, certain comorbidities should be ruled out. If a patient has glaucoma or pheochromocytoma, they may first need treatment from or clearance by other specialists. Stimulants should likely be held in patients with hypertension, angina, or cardiovascular defects until receiving medical clearance. The risks of stimulants need to be discussed with female patients of childbearing age, weighing the benefits of treatment

against the risks of medication use should the patient get pregnant. Patients with comorbid psychosis or uncontrolled bipolar illness should not receive stimulants due to the risk of exacerbation. Patients with active substance use disorders (SUDs) are generally not good candidates for stimulants because of the risk of misusing or diverting stimulants and the possibility that substance abuse may be causing their inattentive symptoms. Patients whose SUDs are in remission may cautiously be considered as candidates for stimulants. If patients misuse their prescribed stimulants, they should be switched to a nonstimulant medication such as atomoxetine, bupropion, guanfacine, or clonidine.<sup>47</sup>

Once a patient is deemed to be a candidate for stimulants, clinicians need to choose between methylphenidate or amphetamine/dextroamphetamine formulations. *Table 6* (*page 45*) lists medications that are commonly prescribed to treat ADHD; unless otherwise noted, these are FDA-approved for this indication. As a general rule, for adults, long-acting stimulant formulations are preferred over short-acting formulations.<sup>28</sup> Immediate-release stimulants are more prone to misuse or diversion compared to extended-release medications.<sup>29</sup> Longer-acting formulations may also provide better full-day symptom control.<sup>48</sup>

In contrast to many other psychiatric medications, it may be beneficial to encourage periodically taking breaks or "medication holidays" from stimulants. Planned medication holidays for adults can involve intentionally not taking the medication over the weekend when the patient is not involved in work or school responsibilities. Such breaks have been shown to reduce adverse effects of stimulants (such as appetite suppression and insomnia) without significantly increasing ADHD symptoms.<sup>49</sup> Short breaks can

Table 6

## Medications commonly used to treat ADHD

Medication	Starting dose	Maximum dose
<b>Stimulants</b>		
Amphetamine extended-release orally disintegrating tablet (Adzenys XR-ODT)	12.5 mg/d	12.5 mg/d
Amphetamine extended-release suspension (Dyanavel XR)	2.5 or 5 mg/d	20 mg/d
Dexmethylphenidate immediate-release (Focalin)	2.5 to 5 mg twice daily	20 mg/d total
Dexmethylphenidate extended-release (Focalin XR)	10 mg/d	40 mg/d
Dextroamphetamine immediate-release (Dexedrine) <sup>a</sup>	5 mg twice daily	40 mg/d total
Dextroamphetamine extended-release (Dexedrine Spansules) <sup>a</sup>	5 mg twice daily	40 mg/d total
Dextroamphetamine and amphetamine immediate-release (Adderall)	5 mg once or twice daily	60 mg/d total
Dextroamphetamine and amphetamine extended-release (Adderall XR)	10 to 20 mg/d	60 mg/d
Dextroamphetamine and amphetamine triple-bead extended-release (Mydayis)	12.5 mg/d	50 mg/d
Lisdexamfetamine (Vyvanse)	10 to 30 mg/d	70 mg/d
Methylphenidate short-acting immediate-release (Ritalin, Methylin)	10 to 20 mg/d in 2 divided doses	60 mg/d total
Methylphenidate intermediate-acting extended-release (Metadate ER)	10 mg twice daily	60 mg/d total
Methylphenidate long-acting extended-release and transdermal	Adhansia XR: 25 mg/d	Adhansia XR: 100 mg/d
	Aptensio XR: 10 mg/d	Aptensio XR: 60 mg/d
	Concerta, Relexxii: 18 to 36 mg/d	Concerta, Relexxii: 72 mg/d
	Daytrana patch: 10 mg/d (9 h on, 15 h off)	Daytrana patch: 30 mg/d
	Jornay PM: 20 mg/d in evening	Jornay PM: 100 mg/d
	Metadate CD, QuilliChew ER, Quillivant XR: 20 mg/d	Metadate CD, QuilliChew ER, Quillivant XR: 60 mg/d
	Ritalin LA: 10 or 20 mg/d	Ritalin LA: 60 mg/d
<b>Nonstimulants</b>		
Atomoxetine (Strattera)	40 mg/d	100 mg/d
Bupropion sustained-release (Wellbutrin SR) <sup>b</sup>	100 mg/d	200 mg twice daily
Bupropion extended-release (Wellbutrin XL) <sup>b</sup>	150 mg/d	450 mg/d
Viloxazine (Qelbree)	200 mg/d (100 mg/d if severe kidney impairment)	600 mg/d

<sup>a</sup>FDA-approved for use in children/adolescents with ADHD, but not adults

<sup>b</sup>Off-label

ADHD: attention-deficit/hyperactivity disorder; CD: controlled delivery; LA: long-acting

Source: <https://www.uptodate.com/contents/attention-deficit-hyperactivity-disorder-in-adults-treatment-overview>

### Clinical Point

**Medication holidays provide an opportunity to verify the ongoing benefits of the medication**



## Adult ADHD

### Clinical Point

**One study found stimulant treatment alone did not eliminate academic deficits in students with ADHD**

### Related Resources

- National Institute for Health and Care Excellence. Attention deficit hyperactivity disorder: diagnosis and management. <https://www.nice.org.uk/guidance/ng87>
- Substance Abuse and Mental Health Services Administration. Advisory: Prescription Stimulant Misuse Among Youth and Young Adults. <https://store.samhsa.gov/product/prescription-stimulant-misuse-among-youth-young-adults/PEP21-06-01-003>

### Drug Brand Names

Amphetamine • Adzenys, Dyanavel, others	Dextroamphetamine and amphetamine • Adderall, Mydayis
Atomoxetine • Strattera	
Bupropion • Wellbutrin, Forfivo	Guanfacine • Intuniv, Tenex
Clonidine • Catapres, Kapvay	Lisdexamfetamine • Vyvanse
Dexmethylphenidate	Methylphenidate • Concerta, Methylin, others
• Focalin	
Dextroamphetamine	Viloxazine • Qelbree
• Dexedrine	

also help prevent medication tolerance and the subsequent need to increase doses.<sup>50</sup> Medication holidays provide an opportunity to verify the ongoing benefits of the medication. It is advisable to periodically assess whether there is a continued need for stimulant treatment.<sup>51</sup> If patients do not tolerate stimulants or have other contraindications, nonstimulants should be considered.

Lastly, no psychiatric patient should be treated with medication alone, and non-pharmacologic approaches should be incorporated as needed. Clear instructions, visual aids, nonverbal cues, frequent breaks to stand and stretch, schedules, normalizing failure as part of growth, and identifying triggers for emotional reactivity may help patients with ADHD.<sup>52</sup> In a study of the academic performance of 92 college students taking medication for ADHD and 146 control students, treatment with stimulants alone did not eliminate the academic achievement deficit of those individuals with ADHD.<sup>53</sup>

## Bottom Line

A sensible approach to diagnosing attention-deficit/hyperactivity disorder (ADHD) in adults includes ruling out other disorders that may present similar to ADHD, taking an appropriate developmental history, obtaining collateral information, and assessing for functional impairment. Sensible treatment involves ruling out comorbidities that stimulants could worsen, selecting extended-release stimulants, incorporating medication holidays, and using nonpharmacologic interventions.

Good study habits (even without stimulants) appeared more important in overcoming the achievement disparity of students with ADHD.<sup>53</sup> Providing psychoeducation and training in concrete organization and planning skills have shown benefit.<sup>54</sup> Practice of skills on a daily basis appears to be especially beneficial.<sup>55</sup>

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## Clinical Point

**Psychoeducation and training in concrete organization and planning skills have shown benefit**