

# Children with tic disorders: How to match treatment with symptoms

## Algorithm helps determine when behavioral therapy, medication is appropriate

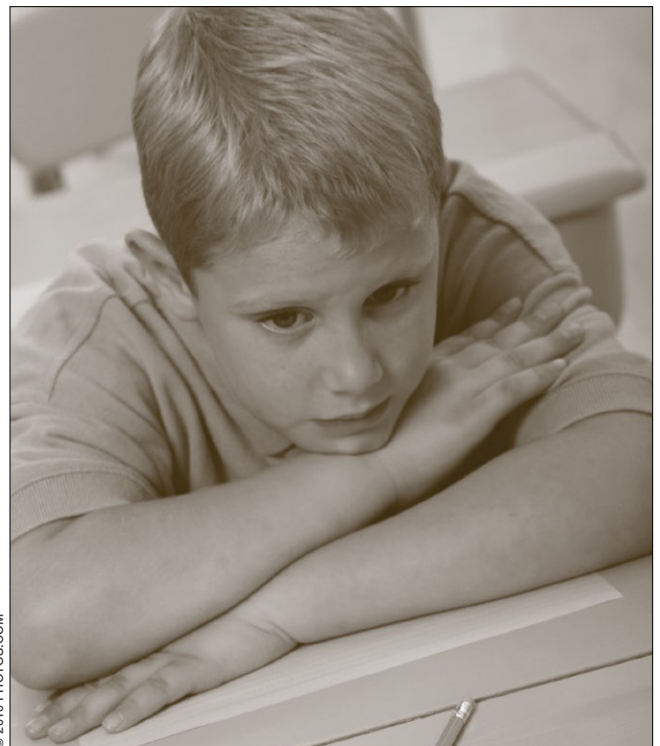
**S**ammy, age 7, is referred to you by his pediatrician because of a 4-week history of frequent eye blinking. His parents say he blinks a lot when bored but very little when playing baseball. They recall that he also has intermittently sniffed and nodded his head over the last 12 months. Neither Sammy nor his friends seem to be bothered by the blinking. Except for the tics, Sammy's physical and mental status exams are normal.

Since preschool, Sammy's teachers have complained that his backpack and desk are always a mess. Sammy is well-meaning but forgetful in his chores at home. A paternal uncle has head-turning movements, counts his steps, and becomes distressed if books on his shelf are not in alphabetical order.

Tics, such as strong eye blinks or repetitive shoulder shrugs, can distress a child or his/her parents, but the conditions associated with tic disorders often are more problematic than the tic disorder itself. High rates of comorbid conditions are recognized in persons with Tourette syndrome, including:

- obsessive-compulsive disorder (OCD) in >80%<sup>1</sup>
- attention-deficit/hyperactivity disorder (ADHD) in ≤70%<sup>2</sup>
- anxiety disorders in 30%<sup>3</sup>
- rage, aggression, learning disabilities, and autism less commonly.

The strategy we recommend for managing tic disorders includes assessing tic severity, educating the family about the illness, determining whether a comorbid condition is present, and managing these conditions appropriately. Above all, we emphasize a risk-benefit analysis



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## Tic disorders in children

### Clinical Point

Tics may resemble other movement disorders, including stereotypies, dystonia, chorea, ballism, and myoclonus

Table 1

## Features of 5 movement disorders that may resemble tics

Tics	Stereotypies	Dystonia	Chorea	Ballism	Myoclonus
Sudden, repetitive, stereotyped, nonrhythmic movements or sounds	Patterned, nonpurposeful movement	Cocontraction of agonist and antagonist muscles, causing an abnormal twisting posture	Continuous, flowing, nonrhythmic, nonpurposeful movement	Forceful, flinging, large amplitude choreic movement	Sudden, quick, shock-like movement
Usually start after age 3	Usually start before age 3 and resolve by adolescence	More common in adults	—	—	—
Decrease when focused; increase when stressed, anxious, fatigued, or bored	Occur when the child is excited	Worsens during motor tasks	Worsens during motor tasks	Worsens during motor tasks	—
Comorbid conditions include OCD and ADHD	Common in children with mental retardation or autism	—	Can occur after streptococcal infection	Can occur after streptococcal infection	—
Preceded by a premonitory urge or sensation	Possibly preceded by an urge	Not preceded by an urge	Not preceded by an urge	Not preceded by an urge	Not preceded by an urge
Temporarily suppressible	Suppressible	Not suppressible	Partially suppressible; can incorporate into semi-purposeful movements	Partially suppressible	Not suppressible

ADHD: attention-deficit/hyperactivity disorder; OCD: obsessive-compulsive disorder

guided by the Hippocratic principle of “do no harm.”

### Characteristics of tic disorders

You diagnose Sammy with Tourette syndrome because he meets DSM-IV-TR criteria of at least 2 motor tics and 1 vocal tic that have persisted for 1 year without more than a 3-month hiatus, with tic onset before age 18. Because tics may resemble other movement disorders, you rule out stereotypies, dystonia, chorea, ballism, and myoclonus (Table 1). You explain to his parents that Sammy’s condition is a heritable, neurobehavioral dis-

order that typically begins in childhood and is associated in families with OCD, ADHD, and autism spectrum disorders.

His parents ask about the difference between tics and other movements. You explain that eye-blinking tics—like other motor tics—appear as sudden, repetitive, stereotyped, nonrhythmic movements that involve discrete muscle groups. (See this article at CurrentPsychiatry.com to view a video of a patient with tics.) Simple motor tics are focal movements involving 1 group of muscles, whereas complex tics are sequential patterns of movement that involve >1 muscle group or resemble purposeful movements (Table 2).

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Table 2

## Characteristics of simple and complex motor and vocal tics\*

Simple tics	Complex tics
Eye blinking or eye rolling	Jumping
Nose, mouth, tongue, or facial grimaces (nose twitch, nasal flaring, chewing lip, teeth grinding, sticking out tongue, mouth stretching, lip licking)	Spinning
Head jerks or movements (neck stretching, touching chin to shoulder)	Touching objects or people
Shoulder jerks/movements (shoulder shrugging, jerking a shoulder)	Throwing objects
Arm or hand movements (flexing or extending arms or fingers)	Repeating others' action (echopraxia)
Coughing	Obscene gestures (copropraxia)
Throat clearing, grunting	Repeating one's own words (palilalia)
Sniffing, snorting, shouting	Repeating what someone else said (echolalia)
Humming	Obscene, inappropriate words (coprolalia)

\*Simple tics are focal movements involving 1 group of muscles; complex tics are sequential patterns of movement that involve >1 muscle group or resemble purposeful movements

Older children frequently describe a premonitory urge prior to the tic. Patients typically can suppress tics for a transient period of time, although during tic suppression they usually feel restless and anticipate performing their tic. The ultimate performance of the tic brings relief. Tic suppression also occurs during focused activity. Emotional stress, fatigue, illness, or boredom can exacerbate tics.

To begin monitoring Sammy's clinical course, you administer 3 assessment tools described in *Table 3* (page 32). You explain to Sammy's parents that these tests will be repeated yearly or when tics worsen. However, you tell his parents that these scores alone will not determine present or future clinical decisions, including treatments. You also recommend that they connect with support groups on the Tourette Syndrome Association (TSA) Web site.

### CASE CONTINUED

#### Changes over time

Sammy's parents appreciate your explanation and say they will share information from the TSA Web site with Sammy's principal, teachers, and classmates. The family agrees to return in 6 months or sooner if the tics worsen.

By age 8, Sammy develops multiple tics: facial grimacing, looking upwards, punching movements, whistling, and throat clearing. He

is slightly bothered by these tics, and his friends have asked him about them. He tells them he has Tourette syndrome, and that usually ends the questioning. He returns for a follow-up visit because his parents notice a dramatic increase in his tics after Sammy's father loses his job.

### Treatment options

When deciding to treat a child's tics, the first step is to determine whether to pursue a nonpharmacologic or pharmacologic approach (*Algorithm, page 33*). To tailor an approach most suited for an individual child, discuss with the family their feelings about therapy and medications. This information—along with tic severity—will help determine a treatment plan.

Behavior therapy and medication are management strategies; neither can cure a tic disorder. The most conservative approach to tic treatment is to:

- provide the child and family with basic guidelines for managing tics
- help alleviate environmental stress and other potential triggers.

### CASE CONTINUED

#### A first intervention

You discuss treatment options with Sammy's family, and they view medication as a last resort. Sammy does not seem to be bothered by his tics, and

### Clinical Point

**Tic assessment scale scores should not be the sole factor used to determine clinical decisions or treatment**



## Tic disorders in children

### Clinical Point

When selecting a treatment plan, consider the family's views on therapy and medications, as well as tic severity

**Table 3**

### 3 scales for assessing tic severity and impact on functioning

Instrument	Purpose	Description	Design	Administration frequency
Yale Global Tic Severity Scale (YGTSS)	Assess tic severity	Review of motor and vocal tics. Rate number, frequency, intensity, complexity, and interference on a 5-point scale	Clinician-rated	Annual and as needed for increased tics
Premonitory Urge for Tics Scale (PUTS)	Detect the presence of unpleasant sensations that precedes tics	10 questions	Self-report	Annual and as needed for increased tics
Gilles de la Tourette Syndrome Quality of Life Scale (GTS-QOL)	Measure quality of life	27 questions, 4 subscales: psychological, physical, obsessional, and cognitive	Self-report	Annual and as needed for increased tics

his parents do not wish to start him on daily medications. Given this situation, habit reversal therapy (HRT) is appropriate for Sammy because he is old enough to participate in HRT to reduce his tics.

**HRT** is an effective nonpharmacologic approach to help children with tics.<sup>4</sup> Its 3 components are:

- awareness training
- competing response training
- social support.<sup>5</sup>

This simplified version of the original HRT can be completed in eight 1-hour sessions. Good candidates are patients who are cognitively mature enough to understand the therapy's goals and compliant with frequent clinic visits. They also must practice the strategies at home.

It should not be difficult for psychiatrists to learn HRT—or refer to therapists who are willing to learn it—with the available instructional manual.

#### CASE CONTINUED

### Practicing alternatives

You ask Sammy to imitate his tics. After helping him become more aware of his tics, you encourage him to develop a more socially appropriate movement to engage in whenever he feels the urge to punch. Sammy chooses to clench his fist in his pocket. He also learns to breathe in

whenever he has an urge to whistle. You advise Sammy's parents to reward his efforts to suppress the tics. He practices the strategies daily.

At age 12, Sammy returns to your office. He has begun to have frequent neck-jerking tics, which cause neck pain and daily headaches. He also is slapping his thigh and having frequent vocal tics characterized by loud shrieking. The vocal tics are disruptive in class, even though Sammy sits toward the back of the room. Sammy's classmates tease him, and he is very frustrated.

### Medication approach

The decision to start a medication for tics is complex. Scores from the YGTSS, PUTS, and GTS-QOL scales (*Table 3*) provide only a partial clinical picture. This decision should be reached after a detailed discussion with the family about benefits and risks of medications and ensuring that everyone's expectations are reasonable.

A variety of medications are available to treat patients with tics (*Table 4, page 34*). No medication can completely eliminate tics, however, and many have substantial side effects. Before initiating medical treatment, consider 3 questions:

- Is moderate or severe pain involved?
- Is there significant functional interference?

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- Is there significant social disruption despite efforts to optimize the social environment for the child?

Sammy's frequent neck-jerking tics now cause chronic daily headaches, and his shrieking vocal tics are interfering with classroom activities, so we recommended a 3-month trial of guanfacine following the dosing schedule in *Table 4* (page 34).

**The first-line pharmacologic agent** for tic suppression generally is an alpha-adrenergic medication, unless the tics are severe.<sup>6</sup>

Clonidine and guanfacine usually are started at low doses and increased gradually. Although not as effective as neuroleptics, alpha-adrenergics have a lower potential for side effects and are easier to use because no laboratory tests need to be monitored. Adverse effects associated with alpha-adrenergic medications include sedation, dry mouth, dizziness, headache, and rebound hypertension if discontinued abruptly.

If tics are causing pain, some clinicians prefer conservative measures such as heat or ice, massage, analgesics, relaxation therapy, and reassurance.

**Second-line agents** include typical and atypical antipsychotics. Haloperidol and pimozide have shown efficacy in reducing tics in placebo-controlled studies,<sup>7,8</sup> as have risperidone (in 4 randomized controlled trials [RCTs]) and ziprasidone (in 1 RCT).<sup>9,10</sup> The emergence of serious side effects is a risk for both typical and atypical antipsychotics (*Table 5, page 35*).

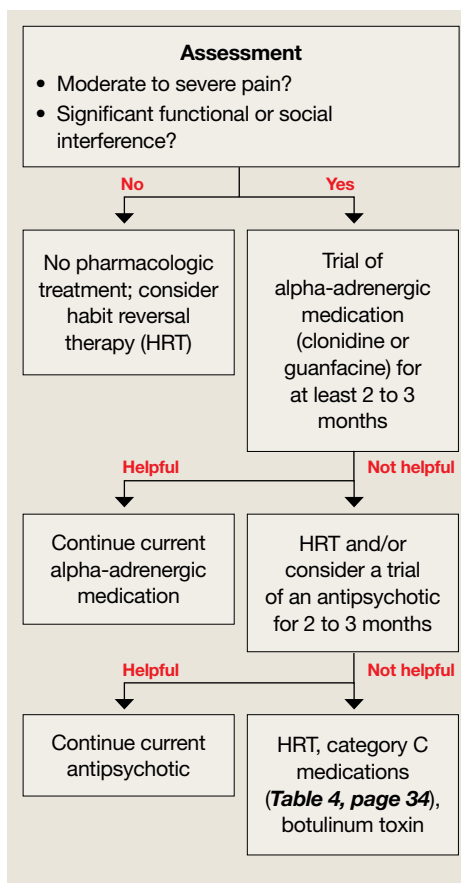
As part of your informed consent discussion, weigh the risk of side effects against the benefits of treatment. Point out to patients and their families that they can expect to see a decrease in tic frequency, but symptoms will not necessarily disappear with any medication. We tell our patients that with antipsychotics the best we can hope for is to reduce tic frequency by approximately one-half.<sup>6</sup>

When treating tics, start with 1 medication. However, if the tics are severe enough to require more than 1 medication, check for drug interactions.

**Third-line agents.** Agents that have not been tested in placebo-controlled trials can be considered third line; these are listed as

**Algorithm**

**Recommended treatment of tics in children and adolescents**



category C (supported by open-label studies) in *Table 4* (page 34). Botulinum toxin injection has been found to be effective for motor and vocal tics.<sup>11,12</sup> Botulinum toxin and implantation of deep brain stimulators<sup>13</sup> are invasive options and generally are reserved for severe, treatment-resistant tics.

**CASE CONTINUED**

**Managing antipsychotics**

After trying guanfacine for 12 weeks, Sammy notices no tic reduction. His parents consent to a low dose of risperidone. You review with them the American Psychiatric Association (APA)/American Diabetes Association (ADA) guidelines<sup>14</sup> for managing metabolic problems in patients treated with atypical antipsychotics.

As instructed in the APA/ADA guidelines, obtain baseline measurements and monitor for metabolic effects of antipsychotic therapy over time (*Table 6, page 36*). Sammy

**Clinical Point**

Alpha-adrenergic medications usually are first-line agents because they have a lower side effect potential than neuroleptics





## Tic disorders in children

### Clinical Point

Botulinum toxin injections have been shown effective for motor and vocal tics but have been tested in only one placebo-controlled trial

**Table 4**

## Medications with evidence of tic-suppressing effects\*

Category A evidence		
Medication	Starting dose	Target dose
Haloperidol	0.25 to 0.5 mg/d	1 to 4 mg/d
Pimozide	0.5 to 1 mg/d	2 to 8 mg/d
Risperidone	0.25 to 0.5 mg/d	1 to 3 mg/d

Category B evidence		
Medication	Starting dose	Target dose
Fluphenazine	0.5 to 1 mg/d	1.5 to 10 mg/d
Ziprasidone	5 to 10 mg/d	10 to 80 mg/d
Clonidine	0.025 to 0.05 mg/d	0.1 to 0.3 mg/d
Guanfacine	0.5 to 1 mg/d	1 to 3 mg/d
Botulinum toxin		30 to 300 units

Category C evidence		
Medication	Starting dose	Target dose
Olanzapine	2.5 to 5 mg/d	2.5 to 12.5 mg/d
Tetrabenazine	25 mg/d	37.5 to 150 mg/d
Baclofen	10 mg/d	40 to 60 mg/d
Nicotine patch	7 mg/d	7 to 21 mg/d
Mecamylamine	2.5 mg/d	2.5 to 7.5 mg/d
Flutamide	250 mg/d	750 mg/d

\*Category A: supported by  $\geq 2$  placebo-controlled trials; category B: supported by 1 placebo-controlled trial; category C: supported by open-label study

Source: Reference 6

starts risperidone at 0.5 mg once daily. After 2 weeks, he notices a decrease in his tics. At the 3-month visit after starting risperidone, he is happy with his risperidone dose and does not want to increase it. He has gained 3 pounds, and you instruct him to eat a well-balanced diet and exercise routinely. At the 6-month visit, his tics are minimal and his weight has stabilized.

You recommend that Sammy remain on risperidone for another 3 months of stability and then begin to taper this medication. You review the risks and benefits of long-term treatment with risperidone, pointing out that it may lead to abnormal movements upon withdrawal, and explain that you typically do not treat children with antipsychotics for more than one year continuously.

### CASE CONTINUED

#### Comorbid symptoms

Since starting 7th grade, Sammy has worried excessively about making mistakes. He spends 6

hours each night on homework, which he often does not turn in because of anxiety about not getting answers perfectly right. Classmates notice that Sammy taps the door 3 times when he comes into the classroom and that he steps over the black tiles in the hallway.

Consider the presence and impact of comorbid OCD or ADHD, which can impair children's quality of life more than tics themselves.<sup>15</sup> Assessment scales can help you make a diagnosis and monitor treatment.

If you suspect OCD, the clinician-rated Children's Yale Brown Obsessive Compulsive Scale is the gold standard for describing the phenomenology and measuring symptom severity. Additional scales to measure symptoms' impact on family life include the Leyton Obsessional Inventory—child version, Family Accommodation Scale for OCD, and Child OCD Impact Scale.

ADHD scales include the Conners Parent Rating Scale—Revised, Conners Teacher

Table 5

Potential adverse effects of antipsychotic treatment in children\*

Adverse effect	Examples
Sedation	—
Acute dystonic reactions	Oculogyric crisis, torticollis
Appetite changes	Weight gain
Endocrine abnormalities	Amenorrhea, diabetes, galactorrhea, gynecomastia, hyperprolactinemia
Cognitive effects	Impaired concentration
Akathisia	Difficulty sitting still
ECG changes	Prolonged QT interval
Parkinsonism	Tremor, bradykinesia, rigidity, postural instability
Tardive syndrome	Orofacial dyskinesia, chorea, dystonia, myoclonus, tics
Neuroleptic malignant syndrome	Potentially fatal; consists of muscular rigidity, fever, autonomic dysfunction, labile blood pressure, sweating, urinary incontinence, fluctuating level of consciousness, leukocytosis, elevated serum creatine kinase

\*Potential adverse effects are listed from most to least likely to occur

Rating Scale—Revised, Swanson, Nolan, and Pelham, or the Vanderbilt ADHD Diagnostic Parent and Teacher Rating Scales. Because ADHD symptoms must be present in more than 1 environment to meet diagnostic criteria, ask parents and teachers to

complete the Conners or Vanderbilt scales.

In children who present with a tic disorder plus a comorbid condition, prioritize treatment by determining which symptoms interfere with the child’s ability to function at school, at home, and in the social arena. Chil-

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## Tic disorders in children

### Clinical Point

Patients with tics and comorbid OCD or ADHD may require cognitive-behavioral therapy and pharmacologic treatment

**Table 6**  
**Children receiving antipsychotics: monitoring recommendations**

Clinical information	Frequency
Family history	Initial visit
Weight	Baseline, monthly
Height	Baseline, monthly
BMI	Baseline, monthly
Waist circumference	Baseline, annually
Blood pressure	Baseline, 3 months after treatment starts, and annually thereafter
Fasting lipid profile	Baseline, every 3 months initially, then every 6 months thereafter
Fasting serum glucose	Baseline, every 3 months, then every 6 months thereafter
BMI: body mass index <b>Source:</b> References 14,16	

Children who require treatment for >1 disorder often are referred initially for cognitive-behavioral therapy for OCD symptoms while receiving pharmacologic treatment for ADHD and/or Tourette syndrome. When necessary, it is usually safe to combine antipsychotics, stimulants, and selective serotonin reuptake inhibitors, although medication interactions should be reviewed in each specific case.

#### References

- Robertson M. Tourette syndrome, associated conditions and the complexities of treatment. *Brain*. 2000;123(3):425-462.
- Freeman R, for the Tourette Syndrome International Database Consortium. Tic disorders and ADHD: answers from a worldwide clinical dataset on Tourette syndrome. *Eur Child Adolesc Psychiatry*. 2007;16(suppl 1):15-23.
- Steffl M. Mental health needs associated with Tourette syndrome. *Am J Public Health*. 1984;74:1310-1313.
- Deckersbach T, Rauch S, Buhlmann U, et al. Habit reversal versus supportive psychotherapy in Tourette's disorder: a randomized controlled trial and predictors of treatment response. *Behav Res Ther*. 2006;44:1079-1090.
- Woods DW, Miltenberger RG. Habit reversal: a review of applications and variations. *J Behav Ther Exp Psychiatry*. 1995;26:123-131.

### Related Resources

- Woods DW. *Managing Tourette syndrome: a behavioral intervention for children and adults. Therapist guide*. New York, NY: Oxford University Press; 2008.
- Tourette Syndrome Association. [www.tsa-usa.org](http://www.tsa-usa.org).
- International OCD Foundation. [www.ocfoundation.org](http://www.ocfoundation.org).

#### Drug Brand Names

Baclofen • Lioresal	Haloperidol • Haldol
Botulinum toxin • Botox, Myobloc	Mecamylamine • Inversine
Clomipramine • Anafranil	Nicotine patch • NicoDerm
Clonidine • Catapres	Olanzapine • Zyprexa
Guanfacine • Tenex	Pimozide • Orap
Fluphenazine • Prolixin	Risperidone • Risperdal
Flutamide • Eulexin	Tetrabenazine • Xenazine
	Ziprasidone • Geodon

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- Scahill L, Erenberg G, Berlin C, et al. Contemporary assessment and pharmacotherapy of Tourette syndrome. *NeuroRx*. 2006;3(2):192-206.
- Shapiro E, Shapiro A, Fulop G, et al. Controlled study of haloperidol, pimozide, and placebo for the treatment of Gilles de la Tourette's syndrome. 1989;46:722-730.
- Sallee F, Nesbitt L, Jackson C, et al. Relative efficacy of haloperidol and pimozide in children and adolescents with Tourette's disorder. *Am J Psychiatry*. 1997;154:1057-1062.
- Scahill L, Leckman J, Schultz R, et al. A placebo-controlled trial of risperidone in Tourette syndrome. *Neurology*. 2003;60:1130-1135.
- Sallee F, Kurlan R, Goetz C, et al. Ziprasidone treatment of children and adolescents with Tourette's syndrome: a pilot study. *J Am Acad Child Adolesc Psychiatry*. 2000;39(3):292-299.
- Marras C, Andrews D, Sime E, et al. Botulinum toxin for simple motor tics: a randomized, double-blind, controlled clinical trial. *Neurology*. 2001;56(5):605-610.
- Porta M, Maggioni G, Ottaviani F, et al. Treatment of phonic tics in patients with Tourette's syndrome using botulinum toxin type A. *Neurol Sci*. 2004;24(6):420-423.
- Porta M, Sevello D, Sassi M, et al. Issues related to deep brain stimulation for treatment-refractory Tourette's syndrome. *Eur Neurol*. 2009;62(5):264-273.
- American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, North American Association for the Study of Obesity. Consensus development conference on antipsychotic drugs and obesity and diabetes. *J Clin Psychiatry*. 2004;65:1335-1342.
- Bernard BA, Stebbins GT, Siegel S, et al. Determinants of quality of life in children with Gilles de la Tourette syndrome. *Mov Disord*. 2009;24(7):1070-1073.
- Understanding the risks of antipsychotic treatment in young people. Advice for managing side effects in children and teenagers. *Harv Ment Health Lett*. 2009;25(9):1-3.

## Bottom Line

Carefully consider risks and benefits before treating a tic disorder. Children may benefit from medications when a tic is painful, causes social problems, or interferes with functioning. First-line treatments include habit reversal therapy, clonidine, and guanfacine; reserve antipsychotics for more severe cases.