TICS IN CHILDREN: INFORMATION FOR PARENTS AND EDUCATORS

By T. Steuart Watson, PhD
University of Nebraska Medical Center

Tics are defined as sudden, recurrent, rapid, brief, and non-rhythmic motor movements (motor tics) or vocalizations (vocal tics) that are thought to be involuntary. Motor and vocal tics can be further categorized into simple or complex types. For instance, common simple motor tics include eye blinking or neck jerking. Common complex motor tics include facial gestures and sniffing objects. Simple vocal tics include throat clearing and snorting. Complex vocal tics include using socially unacceptable or obscene words and repeating the words of others.

Although there are several different diagnostic categories of tics (chronic motor or vocal tics, transient tic disorder), the most common tic disorder is Tourette Syndrome, first described by Gilles de la Tourette (1885). Tourette's is a neurobehavioral disorder consisting of multiple motor and vocal tics. Although the exact cause of Tourette's is unknown, it is believed that it is a result of a complex interaction between genetic, neurological, and environmental factors.

Although temporary tics are estimated to affect 25% of the population, some studies have found prevalence rates of 16–25% among children. Chronic motor and vocal tics are found in about 5–24% of school-age children, while Tourette's affects about 5% of the population, with more males diagnosed than females. Motor tics are far more common than vocal tics among children. Across all types of tics disorders, males are affected three times as often as females.

Although most tics are harmless in and of themselves, some may result in adverse medical, academic, social, and psychological consequences. For instance, tics that involve head jerking could result in spinal compression or other back pain. Children with Tourette's often experience a number of academic problems, including deficits in reading, writing, and math, and are more likely to be placed in special education or to be retained. Children with Tourette's are also more likely to have significant difficulty establishing personal relationships and other social skills that make them popular among their peers. Because of the overt nature of tics, children with tics often display a number of related psychological problems including embarrassment, low self-esteem, and feelings of isolation and are more likely to be diagnosed with Obsessive-Compulsive Disorder (OCD), Attention Deficit Hyperactivity Disorder (ADHD), and learning disabilities.

Medical Interventions
Pharmacological (drug) and behavioral treatments are currently the most common interventions for tics. Neuroleptics are the most commonly used pharmaceutical treatment for tic disorders and are categorized into two types: typical (conventional) and atypical (novel).

Typical neuroleptics include haloperidol (Haldol) and pimozide (Orap). Haloperidol is the most commonly prescribed drug for Tourette's and results in about 80% tic reduction when successful. Pimozide also yields a 70–80% reduction in tic frequency. Leckman, Peterson, Pauls, & Cohen (1997) report that about 70% of patients experience reductions in tic frequency and severity with either haloperidol or pimozide. The side effects associated with the use of typical neuroleptics include those that are annoying (dry mouth, constipation, weight gain, photosensitivity, impotence, restlessness, and muscle spasms) to those that are more serious (including neurological problems such as seizures).

Atypical neuroleptics include olanzapine (Zyprexa), clozapine (Clozaril), and risperidone (Risperdal). These drugs are generally reported to be as effective as typical neuroleptics but carry a lesser risk of serious side effects. Common side effects associated with atypical neuroleptics include insomnia, sedation, weight gain, headache, restlessness, constipation, incontinence, and hypersalivation, while some atypical neuroleptics also induce extrapyramidal symptoms (tremor and stiffness of the muscles) in some patients. Clozapine has also been used to treat tic disorders and is the only neuroleptic that does not carry the risk of extrapyramidal symptoms; however, frequent blood testing is needed owing to the risk of agranulocytosis, a
potentially fatal blood condition if not treated promptly. Olanzapine has been successful for reducing or eliminating vocal and simple motor tics and appears to be relatively safe for adolescents.

When children are diagnosed with a tic disorder and OCD, the first choice of treatment is usually a class of medications known as selective serotonin re-uptake inhibitors (SSRIs). In children diagnosed with a tic disorder and ADHD, it is unclear if stimulant medication increases or decreases tics. Although specific stimulant medications may or may not worsen tics, it appears that dosage may play a significant role. It has been found, for example, that medium doses of methylphenidate (Ritalin) and high doses of dextroamphetamine (Dexedrine) aggravated tic symptoms in about one of four patients. These effects were not noted with either drug at lower doses. Length of time on stimulant medication may also play a role, as long-term administration of methylphenidate was not associated with increased tic severity as was long-term administration of dextroamphetamine. Guanfacine has been used successfully to treat both motor and vocal tics and ADHD behaviors but has not been thoroughly investigated.

It warrants mentioning that commonly prescribed medications for tics, including clonidine, pimozide, haloperidol, and fluphenazine, may actually improve attention, information processing, reaction time, alertness, and working memory. However, some studies have noted that low doses of neuroleptics may interfere with memory and academic performance. These are all important considerations for children with tics and a concurrent diagnosis of learning disability.

**Behavioral Procedures**

Since the 1970s a number of behavioral procedures have been used to treat tics. Some of these include massed negative practice, punishment, contingency management, self-monitoring, habit reversal and simplified habit reversal, prolonged exposure, differential reinforcement, and assertiveness training. Hypnobehavioral methods, such as biofeedback and relaxation training, have also been used to treat tics. Of these, the most consistently effective are habit reversal and simplified habit reversal. Of the remaining procedures, there is insufficient evidence to support the use of massed practice, relaxation training, and punishment as singular treatments for tic disorders. There is some evidence that relaxation training may be useful when combined with other behavioral procedures. There is preliminary support for using differential reinforcement. These strategies are described below.

**Habit reversal.** The original habit reversal technique was developed by Azrin and Nunn in 1973 and has been shown to be highly effective for reducing tics. The original procedure consisted of nine steps that included four steps of promoting awareness, prompting a competing response, three motivational steps, and one generalization step. Azrin and Nunn found habit reversal effective for rapidly reducing nervous habits and tics. Subsequent research has supported the use of habit reversal for reducing or eliminating tics in both children and adults. The primary drawbacks of habit reversal are that it is somewhat lengthy and has multiple components. Thus, abbreviated forms of habit reversal, collectively called simplified habit reversal, have been studied. Results have generally indicated that awareness training and competing response training are sufficient for reducing tics with outcomes comparable to those of the complete habit reversal procedure.

A rather substantial body of literature has accumulated that supports the use of habit reversal and simplified habit reversal for reducing tic behaviors. Similar research has shown that awareness training combined with self-monitoring, awareness training alone, and awareness training with social support and competing response training are also highly effective for reducing motor tics.

**Function-based treatments.** Perhaps because habit reversal, simplified habit reversal, and pharmacological interventions have been so successful in treating tics, there is a limited amount of research looking at alternative and innovative ways of assessing and treating tics. One such way is through the use of functional behavior assessments. Generally, tics may serve one or more of the following four functions: (a) social-negative, (b) social-positive, (c) automatic-positive, and (d) automatic-negative.

Individuals may emit a tic because exhibiting that behavior allows them to escape or avoid something that is unpleasant or aversive, such as a difficult academic task or chore (social-negative). A tic may also result in social attention in that parents and teachers may make comments and/or deliver reprimands when the tic occurs or it may result in the child getting access to a preferred food or toy, for example (social-positive). Last, the behavior itself may feel good (automatic-positive, provide stimulation to the muscles involved in the tic) and/or reduce an unpleasant physiological sensation (automatic-negative, in the case of reducing muscular tension).

When the function(s) of the tic is (are) determined, the consequences that are maintaining the tic may then be applied to non-tic behavior. For example, if a tic results in social attention in the form of reprimands from teachers, parents, and/or peers, the tic would be ignored (extinction) and comments made only when the individual is not engaging in a tic (differential reinforcement). Although
research in this area appears promising, the studies that have been done have not found conclusive evidence that treatments for tics based on function are effective or superior to other more established forms of treatment.

Other Treatments
Other interventions that have been used to reduce tics include flooding, hypnosis, biofeedback, and assertiveness training. Although the evidence regarding the effectiveness of these techniques is rather limited, they do offer some promise. Surgery is sometimes used as a last resort and remains in the experimental stages for individuals with unusually severe tics with associated severe complications that have not responded well to other treatments.

Effects of the Environment on Tics
Recent research has suggested that certain environmental events may worsen the frequency of tics. One study found that vocal tics, but not motor tics, increased when the child was engaged in tic-related conversation. A follow-up study using siblings diagnosed with Tourette's found that tic-related conversation with either of the children increased the rate of tics in both children. These findings have very practical implications for both parents and teachers in that discussion with children about their tics should be kept to a minimum to avoid the possibility that those discussions actually will worsen the tic(s). Other environmental variables that have been found to affect tic frequency and severity include being upset, watching TV, social gatherings, and stressful life events.

Tips for Parents and Teachers
- Embarrassing or punishing the child with a tic are ineffective strategies and probably make the tic worse.
- Avoid drawing attention to the tic by making negative comments or by reprimanding the child.
- Try to identify times when the tic is most likely to occur, determine why those situations are problematic, and give the child a competing response in which to engage instead of the tic.
- Discreetly provide positive reinforcement for tic-free periods.
- Help the child become aware of any physical sensations that occur right before the tic (e.g., tension in the neck or itching in the throat).
- If the child expresses interest in decreasing the tic or if it is interfering with school work, relationships with classmates and/or teachers or parents, seek professional assistance from someone with special expertise in the behavioral assessment and treatment of tics.

Summary
It is estimated that as many as 25% of children will exhibit a motor or vocal tic at some point in their life. Tourette Syndrome, the most serious tic disorder, affects about 5% of the population. With all types of tic disorders, males are affected three times as often as females. Habit reversal, simplified habit reversal, and differential reinforcement are the most effective behavioral methods for treating tics. Medications, particularly neuroleptics, are generally effective but carry many potentially serious side effects that should be considered prior to their administration.

Ongoing research is examining the potential effectiveness of using function-based treatments for treating tics. Although tics often occur in isolation, there is a number of other conditions that may occur with tics including OCD, ADHD, anxiety disorders, and specific learning disabilities. Recent research also suggests that specific environmental events may increase the frequency and intensity of tics, including tic-related conversation as well as situations that produce strong emotional responses.

Resources


Website
Tourette Syndrome Association—www.tsa-usa.org

T. Steuart Watson, PhD, is a Professor in the School Psychology program at Mississippi State University and currently visiting faculty at the University of Nebraska Medical Center.