The Diagnosis of Tourette Syndrome

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This chapter provides some background on how doctors and other health care professionals determine who has “Tourette syndrome” or a related “Tic Disorder.” The condition is named after Georges Gilles de la Tourette, a French physician and neurologist working in Paris in the late 1800s, who published an account of nine individuals in 1885. In this chapter we discuss some of the key clinical features of “Tourette syndrome”. This is important for several reasons. First, our understanding of this condition and related disorders has increased a great deal over the past 30 to 40 years, and it is important to become familiar with key aspects of the symptoms of Tourette. Second, if you are looking at this book, you are probably wondering if someone you know has Tourette. This chapter will go over some of the key features, what it looks like from the outside and how it feels on the inside. We will also cover how the condition typically changes over an individual’s lifetime.

Medical Terminology and What It Means

When Gilles de la Tourette first described the symptoms, he used the name "maladie des tics." So what are tics? **Tics** are a bewildering collection of abrupt movements and sounds. They are often more easily recognized than precisely defined. Tics are sudden, rapid, motor movements or sounds that recur. Usually, tics can be easily mimicked and they can be confused with normal movements or sounds. However, they have a “stereotyped” quality which simply means that the tic looks or sounds more or less the same each time it occurs. We think of tics as simply fragments of normal behavior that appear without any logical reason. Their sudden unexpected nature can excite surprise. If the observer (a parent, teacher, or a peer) does not know
better, they may think that tics are being done “on purpose.” This can be very problematic as we discuss below.

Tics can be described based on their anatomical location, number, frequency, and duration. Another useful descriptor is the intensity or “forcefulness” of the tic, as some tics call attention to themselves simply by virtue of their exaggerated, forceful character. Finally, tics are also described in terms of their “complexity.” Complexity refers to how simple or involved a movement or sound is, ranging from brief, meaningless, abrupt fragments (simple tics) to ones that are longer, more involved, and seemingly more purposive in character (complex tics). Simple tics are sudden, brief (usually less than 1 second in duration), meaningless movements or sounds. Complex tics are sudden, more purposive appearing, stereotyped movements of longer duration that can include “orchestrated” combinations of motor or vocal or motor and vocal tics. The observed range of tics is extraordinary, so that virtually any voluntary motor movement or vocalization can emerge as a tic. Table 1 presents a brief compendium of some of the more common motor and vocal tics sorted by how “complex” the tics are.

Complex tics rarely are seen in the absence of simple tics. In more severe cases continuous orchestrated displays of simple and complex motor tics can occur. In some more severe cases gyrating, bending, and more dystonic appearing movements of the head or torso are also seen. These complex motor tics have also been described as dystonic tics. “Dystonic” refers to the need to maintain a set of sustained muscle contractions that can cause twisting movement of the body resulting in an abnormal
posture. Gilles de la Tourette in his original description was intrigued by a range of complex tics including the imitation of gestures (echopraxia) or sounds or words (echolalia). Doctors call the rude or obscene gestures with hands or tongue “copropraxia” and the uttering of obscenities or rude speech “coprolalia”. Fortunately, only a relatively small percentage of individuals with Tourette exhibit these symptoms. Unfortunately, these tics are often featured in the public media (movies, etc) because of their sensational character. Finally, self-injurious complex tics (hitting the face, biting a hand or wrist) are observed in a very small number of individuals with Tourette.

Premonitory Sensory Urges and that “Fleeting and Incomplete Sense of Relief”

Tics are temporarily suppressible and often, but not always, preceded by a premonitory urge which is similar to the need to sneeze or scratch an itch. Individuals describe the need to tic as the buildup of tension in a particular body location. Depending on the intensity of the urge the individual may consciously decide to tic or not to tic. However, if the urge is very strong, it can be impossible to resist. Examples of the premonitory urges include the feeling of having something in one's throat, or a localized discomfort in the shoulders, leading to the need to clear one's throat or shrug the shoulders. The actual tic may be felt as relieving this tension or sensation, similar to scratching an itch. After the tic is done, there is often a fleeting and incomplete sense of relief. Joseph Bliss, a lifelong Tourette sufferer described his urges this way in 1980:

“There is really no adequate description of the sensations that signal the onset of the actions. The first one seems irresistible, calling for an almost inevitable response...Intense concentration on the site can, itself, precipitate the action...

Tourette syndrome movements are intentional body movements... The end of the
Tourette syndrome action is the ‘feel’ that is frequently accompanied by a fleeting and incomplete sense of relief.”

Another one of the individuals that we follow in our clinic at Yale described it this way:

“A need to tic is an intense feeling that unless I tic or twitch I feel as if I am going to burst. Unless I can physically tic, all of my mental thoughts center on ticcing until I am able to let it out. It's a terrible urge that needs to be satisfied.”

Just because an individual may have some premonitory urges does not mean that every tic is preceded by such an urge. More than 90 percent of all of the 134 Tourette syndrome individuals who participated in a study of these premonitory urges reported having experienced such urges during the past week, but often tics involving more automatic behaviors, like eye blinking, do not have urges that precede them.

The neck shoulder girdle, throat, hands, the midline of the stomach, the front of the thighs and the feet are “hot spots” for premonitory urges (Figure 1). The urges are often located in a small discrete area that can be readily identified. For others, these urges are more generalized and are best captured by a sense of inner tension. Many individuals will report having both types of sensations. These sensory urges have also been described as sensory tics.

Awareness of the these premonitory sensory urges and the fleeting and momentary sense of relief are key elements in one of the behavioral treatments that have been shown to work for Tourette. This behavioral treatment, originally called Habit
Reversal Training (HRT), was developed by Nathan Azrin in the 1970s. It is now referred to as Comprehensive Behavioral Treatment for Tics, CBIT (Chapter 11). The initial phase of HRT and CBIT is “awareness training” where the individual learns to become more acutely aware of premonitory urges and of a momentary and incomplete sense of relief.

It is also important to know that young children under the age of 8 years often are totally unaware of these urges and sometimes they are also unaware of their tics. However, occasionally, we will meet a young child like Natan who carefully told us about his “tite” feelings and his “cramps” that he felt just before specific tics. We vividly recall another boy of seven describing his "Tourette" and his "cocky" going to his lips and making him grimace.

Sensations without Sources

Many individuals with Tourette are remarkably sensitive to and at times easily captured by perceptions arising in the external world. As first noted by Gilles de la Tourette and described above, individuals may unconsciously mirror the behavior (echopraxia) and speech (echolalia) of others as well as of themselves (palilalia): they do and say what they have just seen or heard.

Other instances include "site sensitization" - being unusually aware of, distracted and distressed by particular sensory stimuli. The classic example is tags in new clothing that in some remarkable way serve as a distracting focus of attention. Unless they are removed, it proves difficult for the child to attend to other things. Another related phenomenon is "triggering perceptions." One example of this was reported by a man who goes into a bout of severe vocal tics if he hears a particular woman's cough who
rides the same bus with him in the morning. Other disinhibited behaviors seen in a minority of Tourette sufferers also appear to be perceptually mediated. Specifically, some individuals report the emergence of urges to perform more complex acts that are dangerous, forbidden, or simply senseless and bizarre in response to proscriptive injunctions. An extreme example was told by a retired physicist who during World War II had to give up a job in high energy physics because whenever he saw the sign "Danger High Voltage" he had the urge to touch the apparatus.

Related phenomena may include such things as the urge to touch a hot iron or to put the car in reverse gear while driving down a highway, to touching the breast of an unknown woman in an adjacent seat, or to shouting out in a quiet church service. In these cases the proscription against these behaviors is more of an internal one. Finally, it may be that some of the "just right" phenomena, e.g., the need for things to be arranged over and over again until they look just right, that we associate with the obsessive compulsive side of things also belong in this category (see Chapter 3: Psychiatric Conditions Associated with TS). Those individuals with stimulus-bound tics may also report the distress and frustration over the unwitting acts of others that may provoke their tic symptoms; for example a person's cough or gesture may set off a bout of tics in response. Complex permutations of these mental events are also frequently encountered. They include needing to perform the tic a certain number of times or in a particular way to satisfy the internal urge.

**What is Really Going On?**

In our view, understanding these premonitory sensory urges is important. It is not only important for those who suffer with Tourette, but also for parents, teachers and
friends. In our experience, *if an individual did not have an urge to tic, they would not do the tic*. Tourette is more than just the movements and sounds. Tourette is characterized clinically by a loss of the brain’s “automatic” ability to suppress or “gate” irrelevant sensory information that arises in the body or in an individual’s physical surroundings.

Understanding the sensory component of tics and Tourette can be enormously helpful to parents, as well as other family members, teachers and other children. The movements and sounds at times seem “strange” or “weird,” but what if the person is doing it only because they feel something like the need to scratch or cough? In our experience, this gives everyone a chance to understand something of what it is like to have tics.

It will also be important for doctors and scientists to understand where these sensations are coming from as this may be a key element in understanding why Tourette exists in the first place. Peter Hollenbeck ([2001] see Forward) said it this way:

“I finally apprehend the magnitude of the background noise that I have been experiencing for decades . . . the people around me do not share my tics because they do not hear the drumbeat. They do not feel the sensations without sources, do not have irresistible urges to pause in mid-sentence . . . and so on in endless, bewildering variety . . . . Finally and most important, I feel convinced that this complex challenging enigmatic internal world is the obvious core of Tourette.”

Is It Possible not to Tic?

Almost everyone with Tourette can suppress their tics for brief periods of time. Dr. Donald Cohen, who started the Tourette clinic at Yale would always ask the person to stand up and pretend to be a statute, to be completely still and not make a move.
The children varied a good deal in terms of how well they could suppress their tics. Afterwards, they could also describe better what the “urges to tic” felt like. It is amazing what some people with Tourette can do. We have also met adults who were truly amazing in their ability to hold back their tics, hours at a time. Then in some cases, especially when the person is alone, the tics can “rebound” and erupt with great intensity.

Tic suppression can also be a problem. Parents and teachers can get confused. They think that because the child can hold the tics back for a time that the child is in control and is ticcing only to annoy or frustrate the teacher’s efforts in the classroom. This is why it is so important to get the word out. Teaching teachers about tics and Tourette will help them understand that child in the back of the room so that they do not punish the child or embarrass them in front of their classmates (see Chapter 13, Living with Tourette). Teachers and parents need to set the right example.

What Makes Tics Better or Worse?

Table 2 provides a list of things that can make tics better or worse. This varies from person to person. There are a few things to remember when you look over this list. First, it is good to be prepared and to know ahead of time about situations where the tics may be more noticeable. However, as a general rule, for children it is better not to avoid situations that are part of normal development even if the tics would be more noticeable; for example, birthday parties or school performances. It is far better to keep a child’s development on track than to try to avoid situations where the tics will be worse.
Second, for parents and teachers one of the other lessons that it is important to learn is that if you tell a child to “Stop doing that!!” you are simply setting the stage for more tics to come out as you are making the child more anxious and self conscious. Similarly if you are always asking about the tics or the premonitory urges, more tics will appear. Sometimes tics that have been gone for a long time can reappear.

Third, knowing when the tics will be bad will help many individuals figure out strategies to counter the tics. One of our patients would regularly ask her father to go play ping-pong with her in the basement. Another would just plan to go play his flute. It is also possible that when someone gets really good at the behavioral treatments for tics that it is nothing more than “Doing something that requires focused attention and motor control” (Table 2).

What is an Official Diagnosis?

The most frequently used system for diagnosis in the United States is the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders* (DSM). It now exists in its fourth edition and is often referred to as DSM-IV. The diagnoses in DSM-IV and the code numbers assigned to each of these diagnoses are used for a number of different purposes including research, record keeping, public health records, and insurance reimbursement. The DSM also uses the same code numbers as the *International Classification of Diseases* (ICD) which is now in its tenth edition (ICD-10).
There is no sensitive and specific set of diagnostic tests for Tourette syndrome or other tic disorders at present. The diagnosis is based solely on the individual’s history and clinical presentation. Consequently, the current diagnostic classifications of tic disorders are based on the conventional wisdom of experts in the field and their interpretation of their experience as clinicians as well as the available scientific literature.

DSM and ICD are currently in the midst of being revised by committees of researchers, scientists, and clinicians. These criteria, like the descriptions offered by Georges Gilles de la Tourette have focused on cataloguing and classifying tics as viewed from the outside. Table 3 presents the proposed DSM-V criteria for Tourette Disorder and other Tic Disorders. The other Tic Disorders include: Chronic Motor or Vocal Tic Disorder; Provisional Tic Disorder; and Tic Disorder, Not Otherwise Specified. The major virtue of these additional categories is that they provide the clinician or the researcher with a more precise system for classifying cases that do not neatly fit into one of the principal categories.

These criteria are based on the experience of doctors. They are not fool proof and it is unclear how well they identify the same condition in the brain across individuals with tics (see Chapters 6 and 7; The Causes of TS; and Inheritance, Genes and TS, respectively). This is an important point. As human beings we think “categorically.” Does my child have Tourette or not? I want to know and it really matters in terms of what happens in school and for my insurance company. So does my child have Tourette or
not? This is a simple question, but biology and the brain do not really operate according to DSM-IV or V. Not everyone’s Tourette syndrome or “disorder” is the same.

One important issue is the timing and duration of symptoms so that for Tourette Disorder and Chronic Motor or Vocal Tic Disorder the DSM criteria specify that the tic symptoms “have persisted for more than 1 year since first tic onset.” The one-year time frame is for the most part arbitrary. Is a child’s condition if the tics have been occurring for 10 months really that different from a child whose tic symptoms have been persistent for 12 months?

**Impairment**

One of the features of Tourette that is missing from the diagnostic criteria is the degree of impairment and disruption associated with the condition. Partly dependent on frequency, intensity, complexity, and duration of specific tics, estimates of impairment also need to include the impact on the individual's self-esteem, family life, social acceptance, school or job functioning, and physical well-being. For example, a very frequent simple motor wrist tic may be less impairing than an infrequently occurring, forceful copropraxic gesture. Older individuals with Tourette are often acutely aware of their tics and their impact on other people, setting the stage either anxiety and distress or a determined effort to be a “self advocate.” The stress and anxiety can lead to a vicious cycle that can have serious detrimental effects on self-esteem and limit socialization which can in turn lead to more severe tics.

Being a **self-advocate** means letting other people know about the tics and if they are interested, teaching them about the tics and what they are like to have. This brings to mind the motto of the New Mexico Tourette Syndrome Association (TSA) Chapter:
“We have tics, but we don’t have fleas.” Local TSA Chapters working with schools and parents can, and regularly DO make a big difference in how children with tics are perceived by teachers and peers.

The Timing of Tics

The DSM criteria mention, “waxing and waning.” This is a very important feature of tics. This simply means that over a period of weeks to months a person’s tics get better or worse. We still do not understand why this happens. Is it due to changes in stress levels or the flu season? Or perhaps it is due to the circuits and the biology of the brain cells that regulate those circuits.

Individual tics tend to occur in “bouts.” A bout is a brief, or not so brief, series of tics with relatively regular inter-tic intervals that can be measured in seconds or even fractions of a second. These bouts themselves occur in bouts and may account for transient periods of tic exacerbation that occur during the course of a typical day. Few scientific studies have focused on the timing of tics. But speculation has focused on the “fractal” occurrence of tics. This fractal quality means that regardless of the time increments studied, seconds, minutes, hours, days, weeks, or years, the nonlinear temporal patterning of tics or bouts of tics or bouts-of-bouts of tics or bouts-of-bouts-of-bouts of tics or bouts-of-bouts-of-bouts-of-bouts of tics remains basically the same (Figure 2). This quality, if confirmed, may elucidate a fundamental property of tics and tic disorders. For example, the well known waxing and waning course of tics may simply be another way to refer to bouts-of-bouts-of-bouts-of-bouts of tics and the time interval between them. At the other end of the time scale, it is possible that an examination of the neural mechanisms underlying this fractal phenomenon may identify...
related events that can be measured in milliseconds or even shorter intervals that are associated with the generation of tic phenomena. The timing of the firing of brain cells may also provide some important clues to identifying, in very rare severe cases where an individual has treatment resistant, self injurious tics where to place the electrodes that are used in deep brain stimulation (DBS) (see Chapter 11, Surgical Intervention).

Insert Figure 2 about here

Tics then might be best understood as being the product of nested processes that unfold over many time scales, from milliseconds to years or even decades. This brings us to the next important topic, the natural course of Tourette.

The Natural History of Tics and Tic Disorders

Tics usually have their onset in the first decade of life. Most investigators report a median onset of simple motor tics at five or six years of age. Figure 3 presents age of onset data for 221 individuals with Tourette syndrome evaluated at Yale.

Insert Figure 3 about here

Subsequently, the classic history includes a waxing and waning course and a changing repertoire of tics. Typically, in cases of Tourette syndrome, the symptoms multiply and worsen so that even during the waning phases the tics are troublesome. Importantly for a majority of individuals the period of worst ever tic severity usually falls between the ages 7 and 15 years of age following which there is a steady decline in tic
Making the Diagnosis of TS; Leckman

severity. The average age of a person’s worst ever tic severity is usually close to 11 years (Figure 4). This fall off in tic symptoms is consistent with available epidemiological data that indicate a lower prevalence of Tourette syndrome among adults compared to children (see Chapter 5: The Occurrence of Tics in the World). It is also typical of the findings in our follow-up studies of individuals that we first met as children and who we sought out in early adulthood to see how they were doing. In many instances, the phonic symptoms become increasingly rare or may disappear altogether.

Insert Figure 4 about here

In adulthood, a patient’s repertoire of tics usually diminishes in size and becomes predictable during periods of fatigue and heightened emotionality. Complete remission of both motor and phonic symptoms has also been reported, but estimates vary considerably with some studies reporting rates of remission as high as 50%. In such cases, the legacy of Tourette syndrome in adult life is most closely associated with what it “meant” to have severe tics as a child. For example, the individual who was misunderstood and punished at home and at school for their tics or who was teased mercilessly by peers will fare worse than a child whose interpersonal environment was more understanding and supportive and who was encouraged to become a self-advocate and to not be ashamed of their tics.

In contrast, adulthood is also the period when the most severe and debilitating forms of tic disorder can be seen. In this small minority of adults severe tics can persist or re-emerge with frightening intensity. At their worst these tics can be self-injurious
and disabling, placing in serious jeopardy an individual's accomplishments and aspirations.

Not everyone's Tourette Syndrome or "Disorder" is the Same

Global outcome and social and educational functional capacities in adulthood are not synonymous with tic outcomes. The major reason for this discrepancy is that a majority of individuals with Tourette also suffer from related disorders. In addition to tics, many patients with Tourette syndrome have symptoms of attention-deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), or both and a range of other mood and anxiety disorders. As presented in Chapters 3 (Psychiatric Conditions Associated with TS). These coexisting disorders can add greatly to morbidity associated with Tourette syndrome and detract from the individual's overall quality of life. Increased irritability and rage attacks are also not so uncommon among patients with Tourette syndrome (Chapter 4: Problems with Impulse Control, Anger, and Rage in TS). Strikingly in both population-based studies and in our clinical experience these co-occurring disorders occur more commonly in individuals who met the full criteria for Tourette. Individuals with Chronic Motor or Vocal Tic Disorder are much less likely to be affected by these symptoms to the same degree as those with Tourette. When additional disorders are present the individual's quality of life is usually poorer, and the level of overall impairment is usually much greater than if the individual just meets the criteria for Tourette syndrome.

What to Look for in an Evaluation and Some Parting Thoughts
Accumulated clinical experience during the past three decades confirms the adage that clinical evaluation of the child or adolescent with Tourette syndrome properly considers the “whole person,” possessed of a rich personal and interpersonal life, not just a collection of abnormal sensory urges and tic symptoms. In the process of a comprehensive evaluation, the full range of difficulties and competencies should be charted beginning with the individual child’s or adult’s strengths and interests. Given the current limitations in treating tics with behavioral interventions and medications (see Chapters 9 and 10, Drug Treatments and Behavioral Therapy, respectively), we regularly encourage families to build on their child’s strengths.

Apart from building on the individual’s strengths and keeping their development on track, a critical question is the degree to which tics interfere with the child’s emotional, social, familial, and school experiences. To determine this, it is often useful to monitor symptoms over a few months to assess their severity and fluctuation, impact on the family, and the child’s and family’s adaptation. This monitoring can often be accomplished by the family keeping records or using standard forms.

Although the distressed family may focus on the upsetting and socially stigmatizing tics, it is the clinician’s responsibility to place the tics into the proper context of the child’s overall development. By the time of evaluation, the child may be upset by his or her inability to control the tics and by criticism from parents, teachers, and peers who exhort him or her to control his or her strange behavior, which they may believe he or she can control. Central tasks of evaluation include the clarifying and addressing of family issues, such as parental guilt and misconceptions. Indeed, diagnostic evaluation is closely connected with the first steps of treatment.
Acknowledgements

This chapter is dedicated to the memory of Donald J. Cohen who founded the Yale Tic Disorders Clinic more than 35 years ago and the many individuals and families who we have evaluated and followed over this period of time. Add to this the many clinicians and researchers who have been trained in the clinic and subsequently gone on to become leaders in this field.
References


Peterson BS, Leckman JF: Temporal characterization of tics in Gilles de la Tourette syndrome. Biol Psychiatry 1998; 44:1337-1348
### Table 1: Examples of Simple and Complex Motor and Vocal Tics

<table>
<thead>
<tr>
<th>Tic Symptoms</th>
<th>Examples</th>
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<tbody>
<tr>
<td><strong>Simple Motor Tics:</strong></td>
<td></td>
</tr>
<tr>
<td><em>Sudden, brief,</em></td>
<td>Eye blinking, eye movements, grimacing, nose twitching, mouth movements, lip pouting, head jerks, shoulder shrugs, arm jerks, abdominal tensing, kicks, finger movements, jaw snaps, tooth clicking, rapid jerking of any part of the body</td>
</tr>
<tr>
<td><em>meaningless</em></td>
<td></td>
</tr>
<tr>
<td><em>movements</em></td>
<td></td>
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<tr>
<td><strong>Complex Motor Tics:</strong></td>
<td></td>
</tr>
<tr>
<td><em>Slower, longer, more &quot;purposeful&quot; movements</em></td>
<td>Sustained &quot;looks,&quot; facial gestures, biting, touching objects or self, throwing, banging, thrusting arms, gestures with hands, gyrating and bending, dystonic postures (holding an uncomfortable pose), copropraxia (obscene gestures)</td>
</tr>
<tr>
<td><strong>Simple Phonic Tics:</strong></td>
<td></td>
</tr>
<tr>
<td><em>Sudden, meaningless,</em></td>
<td>Throat clearing, coughing, sniffling, spitting, screeching, barking, grunting, gurgling, clacking, hissing, sucking, and innumerable other sounds</td>
</tr>
<tr>
<td><em>sounds or noises</em></td>
<td></td>
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<tr>
<td><strong>Complex Phonic Tics:</strong></td>
<td></td>
</tr>
<tr>
<td><em>Sudden, more &quot;meaningful&quot; utterances</em></td>
<td>Syllables, words, phrases, statements such as &quot;shut up,&quot; &quot;stop that,&quot; &quot;oh, okay,&quot; &quot;I've got to,&quot; &quot;okay honey,&quot; &quot;what makes me do this?,&quot; &quot;how about it,&quot; or &quot;now you've seen it,&quot; speech atypicalities (usually rhythms, tone, accents, intensity of speech); echo phenomenon (immediate repetition of one's own or another's words or phrases); and coprolalia (obscene, inappropriate, and aggressive words and statements)</td>
</tr>
</tbody>
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### Table 2: What Makes Tics Better or Worse

<table>
<thead>
<tr>
<th>Better</th>
<th>Worse</th>
</tr>
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<tbody>
<tr>
<td>• Sleep (almost always the tics will disappear)</td>
<td>• Excitement, like going off to Disney World for the first time, birthdays, holidays especially with presents (almost always)</td>
</tr>
<tr>
<td>• Doing something that requires focused attention and motor control, like riding a bicycle or playing ping-pong or plying a musical instrument (almost always)</td>
<td>• Being anxious or upset or noticing stress in a loved one (almost always)</td>
</tr>
<tr>
<td>• During and after physical exercise (usually the tics will diminish or be less forceful)</td>
<td>• Watching exciting movies (in the theater) or television shows (almost always)</td>
</tr>
<tr>
<td>• Excitement, like going off to Disney World for the first time, birthdays, holidays especially with presents (almost always)</td>
<td>• Being tired, but not quite ready to fall asleep (almost always)</td>
</tr>
<tr>
<td>• Being anxious or upset or noticing stress in a loved one (almost always)</td>
<td>• Being alone (almost always)</td>
</tr>
<tr>
<td>• Watching exciting movies (in the theater) or television shows (almost always)</td>
<td>• Being sick or being injured (almost always)</td>
</tr>
<tr>
<td>• Being tired, but not quite ready to fall asleep (almost always)</td>
<td>• Asking about or imitating a person’s tics, tics are “suggestible” (almost always)</td>
</tr>
<tr>
<td>• Being alone (almost always)</td>
<td>• Menstruation (only for some women)</td>
</tr>
<tr>
<td>• Being sick or being injured (almost always)</td>
<td>• Eating (only for some individuals)</td>
</tr>
<tr>
<td>• Asking about or imitating a person’s tics, tics are “suggestible” (almost always)</td>
<td>• Drinking coffee (only for some individuals)</td>
</tr>
<tr>
<td>• Menstruation (only for some women)</td>
<td>• Being too hot, hot weather (only for some individuals)</td>
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</tbody>
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**Table 3: Proposed DSM-V Tic Disorder Classification**

<table>
<thead>
<tr>
<th>I. Diagnostic Criteria for Tourette Disorder (307.23):</th>
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<tbody>
<tr>
<td>A. Both multiple motor tics and one or more vocal tics have been present at some time during the illness, although not necessarily concurrently. <em>(A tic is a sudden, rapid, recurrent, nonrhythmic motor movement or vocalization.)</em></td>
</tr>
<tr>
<td>B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.</td>
</tr>
<tr>
<td>C. The onset is before age 18 years.</td>
</tr>
<tr>
<td>D. The disturbance is not due to the direct physiological effects of a substance (e.g., cocaine) or a general medical condition (e.g., stroke, Huntington's disease, postviral encephalitis)</td>
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<table>
<thead>
<tr>
<th>II. Diagnostic Criteria for Chronic Motor or Vocal Tic Disorder (307.22):</th>
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<tbody>
<tr>
<td>A. Single or multiple motor tics or vocal tics, but not both, have been present at some time during the illness. <em>(A tic is a sudden, rapid, recurrent, nonrhythmic motor movement or vocalization.)</em></td>
</tr>
<tr>
<td>B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.</td>
</tr>
<tr>
<td>C. The onset is before age 18 years.</td>
</tr>
<tr>
<td>D. The disturbance is not due to the direct physiological effects of a substance (e.g., cocaine) or a general medical condition (e.g., stroke, Huntington's disease, postviral encephalitis)</td>
</tr>
</tbody>
</table>
E. Criteria have never been met for Tourette disorder.

Specify if:

- Motor tics only
- Vocal tics only

**III. Diagnostic Criteria for Provisional Tic Disorder (307.21):**

A. Single or multiple motor tics and/or vocal tics (A tic is a sudden, rapid, recurrent, nonrhythmic motor movement or vocalization.)

B. The tics have been present for less than 1 year since first tic onset.

C. The onset is before age 18 years.

D. The disturbance is not due to the direct physiological effects of a substance (e.g., cocaine) or a general medical condition (e.g., stroke, Huntington’s disease, or postviral encephalitis).

E. Criteria have never been met for Tourette Disorder or Chronic Motor or Vocal Tic Disorder.

**IV. Diagnostic Criteria for Tic Disorder, Not Otherwise Specified (307.20):**

This category is for a tic disorder that does not meet criteria for a specific Tic Disorder. An example is tics with an onset after age 18.
Making the Diagnosis of TS; Leckman

Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition.

http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=111
Figure Legends

**Figure 1: Density of Premonitory Urges.** The densities of premonitory urges for each of 89 anatomical regions are depicted. The highest density on the scale represents the total premonitory urges per region per person, the lowest “0” urges per region per person and the midpoint “20” urges per region per person. These data are based on current premonitory urges ever experienced as assessed in a self report questionnaire (N = 135).


**Figure 2: Fractal character of the temporal occurrence of tics.** Progressively longer time dimensions (seconds to months) are heuristically depicted in this figure (A-E). Tics occur in bouts (A) and bouts of tics occur in bouts (B). We predict that regardless of the temporal dimension, the bout-like appearance of tics (or higher order combinations of bouts and bouts of bouts of tics) will be observed. This fractal quality may well underlie the waxing and waning of tics observed over weeks to months (E) as well as other features of the natural history of Tourette syndrome.

Figure 3: Age of Onset Distribution. This figure presents the age of onset of tics in a series of 221 individuals with Tourette syndrome evaluated at the Yale Child Study Clinic.


Figure 4: Course of Tic Severity over the First Two Decades. A. Data on the relative severity of tics are presented for 42 individuals with Tourette syndrome (A-D). The relative tic severity scale goes from 0 (no tics) to 5 (severe tics). Estimates from the patient and a respective parent were obtained independently.


B. Box plot representing age when tic disorder (OCD) symptoms were at their worst (N=46).

Figure 1
Figure 2

- Individual tics
- Bouts of tics
- Bouts-of-bouts of tics
- Bouts-of-bouts-of-bouts of tics
- Bouts-of-bouts-of-bouts-of-bouts of tics

Time (Months, Weeks, Days, Hours, Seconds)
Figure 3

The graph shows the distribution of the age of onset of tics in TS cases. The peak number of cases occurs at approximately 6.7 years old with a standard deviation of 3.0 years. The total number of cases in the sample is 221.
Figure 4

A.

RELATIVE TIC SEVERITY (ARRTS)

AGE (y)

○ Actual Means
- Estimates from Model

B.