ESSTS

17th International Conference on Tourette Syndrome & Tic Disorders

TS school

Athens

TS-school Athens | Tuesday, 20th May 2025, Eugenides Foundation

Assessment of tics and differential diagnosis

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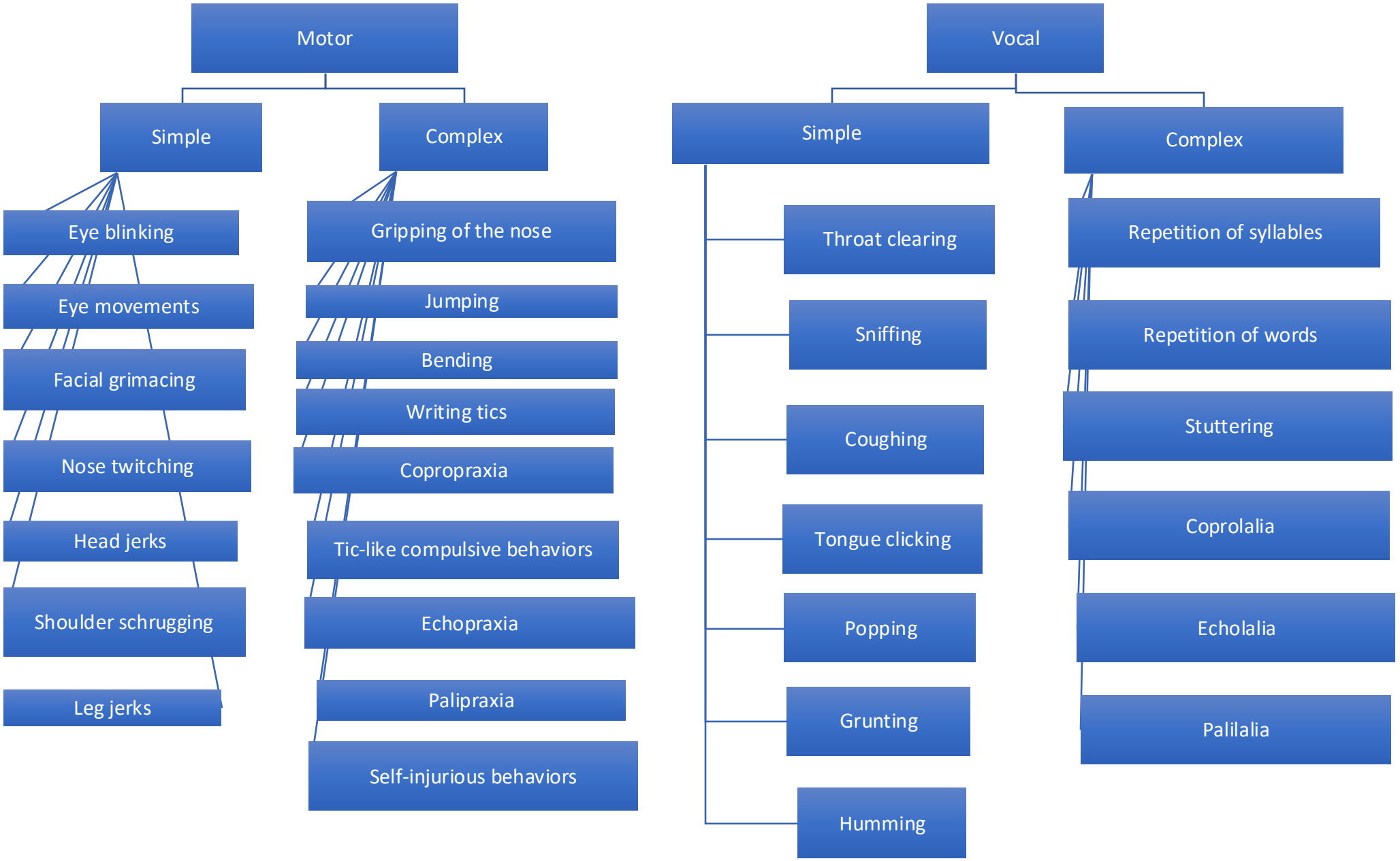
What are tics?

NOTE: All slides with confidential/sensitive videos have been removed

Epidemiology

- Tourette syndrome is found in about 1 % of population
- Tic disorders are found in about 10–15 % of children in kindergarten
- 4:1 more frequently found in males


Motor
Simple
Complex
Eye blinking
Eye movements
Facial grimacing
Nose twitching
Head jerks
Shoulder schrugging
Leg jerks
Gripping of the nose
Jumping
Bending
Writing tics
Copropraxia
Tic-like compulsive behaviors
Echopraxia
Palipraxia
Self-injurious behaviors
Vocal
Simple
Complex
Throat clearing
Sniffing
Coughing
Tongue clicking
Popping
Grunting
Humming
Repetition of syllables
Repetition of words
Stuttering
Coprolalia
Echolalia
Palilalia

Type of tic	Typical features
Motor	Arise in the voluntary musculature and involve discrete muscles or muscle groups
Vocal	Consist of any noise produced by movement of air through the nose, mouth or pharynx
Stimulus-bound	Occur in response to internal or external stimuli (visual, phonic, tactile or mental)
Blocking	Motor or vocal tics that interrupt the voluntary action without alteration of consciousness (dysfluency of speech or gait)
Simple	Are restricted to one muscle or a single muscle group (e.g. eye blinking, nose twitching, tongue protrusion), simple, meaningless sounds (e.g. grunting, throat clearing, coughing, sniffling and barking)
Complex	Involvement of more muscle groups (e.g. repetitive touching of objects or people, repetitive obscene movements (copropraxia), mimicking others (echopraxia) complex vocal tics are words or phrases, expressing obscenities (coprolalia), repeating others (echolalia) or repeating oneself (palilalia))
Clonic	Last less than 100 ms
Dystonic	Last more than 300 ms Repetitively abnormal posture of a kind that one may see in dystonia
Tonic	Last more than 300 ms Relatively long duration of the contraction (in e.g. back muscles) without exhibiting abnormal postures

Szejko et al. Eur Child Adolesc Psychiatry. 2022 Mar;31(3):383-402. doi: 10.1007/s00787-021-01842-2. Epub 2021 Oct 18.

The Yale Global Tic Severity Scale - Revised

MOTOR TIC SYMPTOM CHECKLIST

*Check motor tics that were present over the **past week**. When multiple tics within the same category are present (e.g., other simple motor tics), please count them **separately** on Tic Number Dimension.*

- **Simple Motor Tics** (Rapid, Darting, "Meaningless"):
  - Eye blinking
  - Eye movements
  - Nose movements
  - Mouth movements
  - Facial grimace
  - Head jerks/movements
  - Shoulder shrugs
  - Arm movements
  - Hand movements
  - Abdominal tensing
  - Leg, foot, or toe movements
  - Other simple motor tics (list and describe):

_____

_____

Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

Complex motor tics

- **Complex Motor Tics** (Slower, "Purposeful"):
  - Eye movements
  - Mouth movements
  - Facial movements or expressions
  - Head gestures or movements
  - Shoulder movements
  - Arm movements
  - Hand movements
  - Writing tics
  - Dystonic postures
  - Bending or gyrating
  - Rotating
  - Leg or foot or toe movements
  - Blocking
  - Tic related compulsive behaviors (touching, tapping, grooming, evening-up)
  - Copropraxia
  - Self-abusive behavior
  - Paroxysms of tics (displays), duration ___ seconds
  - Disinhibited behavior (describe):*

    _____

  - Other (list and describe):

    _____

Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

PHONIC TIC SYMPTOM CHECKLIST

*Check phonic tics that were present over the **past week**. When multiple tics within the same category are present (e.g., other simple phonic tics), please count them **separately** on Tic Number Dimension*

- **Simple Phonic Symptoms** (Fast, "Meaningless" Sounds):
  - Coughing
  - Throat clearing
  - Sniffing
  - Snorting
  - Grunting
  - Gulping
  - Whistling
  - Humming
  - Mouth Noises (e.g., clicking, gargling, popping, kissing noises)
  - Burping
  - Hiccups
  - Atypical breathing tics (e.g., forceful exhalation, wheezing, gasping, panting)
  - Chirping or other bird noises (e.g., screeching):_____
  - Barking or other dog noises (e.g., growling): _____
  - Other animal noises (e.g., squealing)
  - Other simple phonic tics (list and describe):

_____

_____

Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

- **Complex Phonic Symptoms** (Language: Words, Phrases, Statements):
  - Syllables (e.g., "ahhh", "woo", "hmmm"):

    _____
  - Words (e.g., "what", "dang", "Okay"):

    _____
  - Phrases (e.g., "oh no", "here we go", "I know"):

    _____
  - Coprolalia (e.g., obscene words):

    _____
  - Echolalia (e.g., repeating others words or phrases)
  - Palalalia (e.g., repeating self)
  - Blocking (e.g., halted speech blocked speech, stuttering)
  - Speech atypicalities (e.g., slow/fast speech rate, nasal speech, quivering voice, high or low pitch/tone/volume):

    _____
  - Disinhibited speech (e.g., blurting out words, talking excessively):

    _____
  - Other complex phonic tics (e.g., list and describe):

    _____

    _____

Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

NUMBER	Motor	Phonic	
NONE. No tics present.	o	o	0
MINIMAL. Single tic present.	o	o	1
MILD. Multiple discrete tics (2-5).	o	o	2
MODERATE. Multiple discrete tics (>5).	o	o	3
MARKED. Multiple discrete tics plus as least one orchestrated pattern of multiple simultaneous or sequential tics, where it is difficult to distinguish discrete tics.	o	o	4
SEVERE. Multiple discrete tics plus several (>2) orchestrated paroxysms of multiple simultaneous or sequential tics, where it is difficult to distinguish discrete tics.	o	o	5

FREQUENCY	Motor	Phonic	
NONE. No tics present.	o	o	0
MINIMAL. Specific tics are usually present on a daily basis, but there are long tic-free intervals during the day. Bouts of tics may occur on occasion, but are not sustained for more than a few minutes at a time.	o	o	1
MILD. Specific tics are present on a daily basis. Tic free intervals as long as 3 hours are not uncommon. Bouts of tics occur regularly, but generally limited to a single setting.	o	o	2
MODERATE. Specific tics are present virtually every waking hour of every day. Bouts of tics are common and may not be limited to a single setting.	o	o	3
MARKED. Specific tics are present every waking hour. Bouts of tics are common and may occur in multiple settings.	o	o	4
SEVERE. Specific tics are present virtually all the time. Tic free intervals are difficult to identify and do not last more than 5 to 10 minutes. Bouts of tics are **very common and occur in multiple settings**.	o	o	5

INTENSITY	Motor	Phonic	
NONE. No tics present.	o	o	0
MINIMAL. Tics not visible or audible (based solely on patient's private experience), or tics are less forceful than comparable voluntary actions and are typically not noticed because of their intensity.	o	o	1
MILD. Tics are not more forceful than comparable voluntary actions or utterances, and are typically not noticed because of their intensity.	o	o	2
MODERATE. Tics are more forceful than comparable voluntary actions, but are not outside the range of normal expression for comparable voluntary actions or utterances. They may call attention to the individual because of their forceful character.	o	o	3
MARKED. Tics are more forceful than comparable voluntary actions or utterances and typically have an "exaggerated" character. Such tics frequently call attention to the individual because of their forceful and exaggerated character.	o	o	4
SEVERE. Tics are extremely forceful and exaggerated in expression. These tics call attention to the individual and may result in risk of physical injury (accidental, provoked, or self-inflicted) because of their forceful expression.	o	o	5

COMPLEXITY	Motor	Phonic	
NONE. No tics present.	o	o	0
MINIMAL. If present, all tics are clearly "simple" (sudden, brief, purposeless) in character.	o	o	1
MILD. Some tics are not clearly "simple" in character.	o	o	2
MODERATE. Some tics are clearly "complex" (purposive in appearance) and mimic brief "automatic" behaviors, such as grooming, syllables, or brief meaningful utterances such as "ah huh" or "hi" that could be camouflaged.	o	o	3
MARKED. Some tics are more "complex" (more purposive and sustained in appearance) and may occur in orchestrated bouts that would be difficult to camouflage, but could be rationalized or "explained" as normal behavior or speech (tapping, saying "you bet", "honey", "FF", "sh", or brief echolalia).	o	o	4
SEVERE. Some tics are very "complex" in character and tend to occur in sustained orchestrated bouts that would be difficult to camouflage and could not be easily rationalized as normal behavior or speech because of their duration and/or their unusual, inappropriate, bizarre or obscene character (a lengthy facial contortion, touching genitals, echolalia, speech atypicalities, bouts of copropraxia, self-abusive behavior, coprolalia).	o	o	5

INTERFERENCE	Motor	Phonic	
NONE. No tics present.	o	o	0
MINIMAL. When tics are present, they do not interrupt the flow of behavior or speech.	o	o	1
MILD. When tics are present, they occasionally interrupt the flow of behavior or speech.	o	o	2
MODERATE. When tics are present, they frequently interrupt the flow of behavior or speech, but do not disrupt intended behavior or speech.	o	o	3
MARKED. When tics are present, they frequently interrupt the flow of behavior or speech, and they occasionally disrupt intended action or communication.	o	o	4
SEVERE. When tics are present, they frequently disrupt intended action or communication.	o	o	5

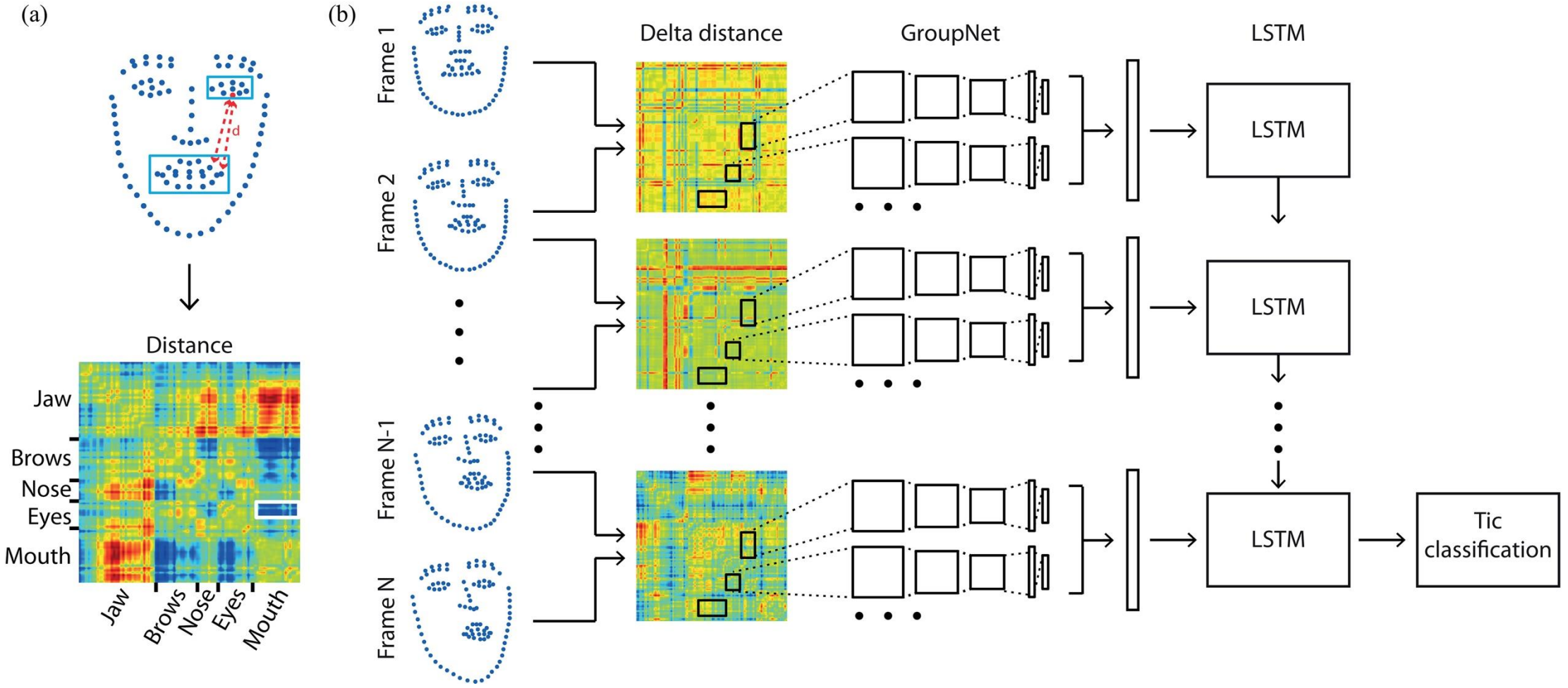
Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

IMPAIRMENT SCALE

NONE.	o	**0**
MINIMAL. Tics associated with subtle difficulties in self-esteem, family life, social acceptance, or school or job functioning (infrequent upset or concern about tics vis a vis the future, periodic, slight increase in family tensions because of tics, friends or acquaintances may occasionally notice or comment about tics in an upsetting way).	o	**10**
MILD. Tics associated with minor difficulties in self-esteem, family life, social acceptance, or school or job functioning.	o	**20**
MODERATE. Tics associated with some clear problems in self-esteem family life, social acceptance, or school or job functioning (episodes of dysphoria, periodic distress and upheaval in the family, frequent teasing by peers or episodic social avoidance, periodic interference in school or job performance because of tics).	o	**30**
MARKED. Tics associated with major difficulties in self-esteem, family life, social acceptance, or school or job functioning.	o	**40**
SEVERE. Tics associated with extreme difficulties in self-esteem, family life, social acceptance, or school or job functioning (severe depression with suicidal ideation, disruption of the family (separation/divorce, residential placement), disruption of social ties - severely restricted life because of social stigma and social avoidance, removal from school or loss of job).	o	**50**

Neurology. 2018 May 8;90(19):e1711-e1719.doi: 10.1212/WNL.0000000000005474. Epub 2018 Apr 13.

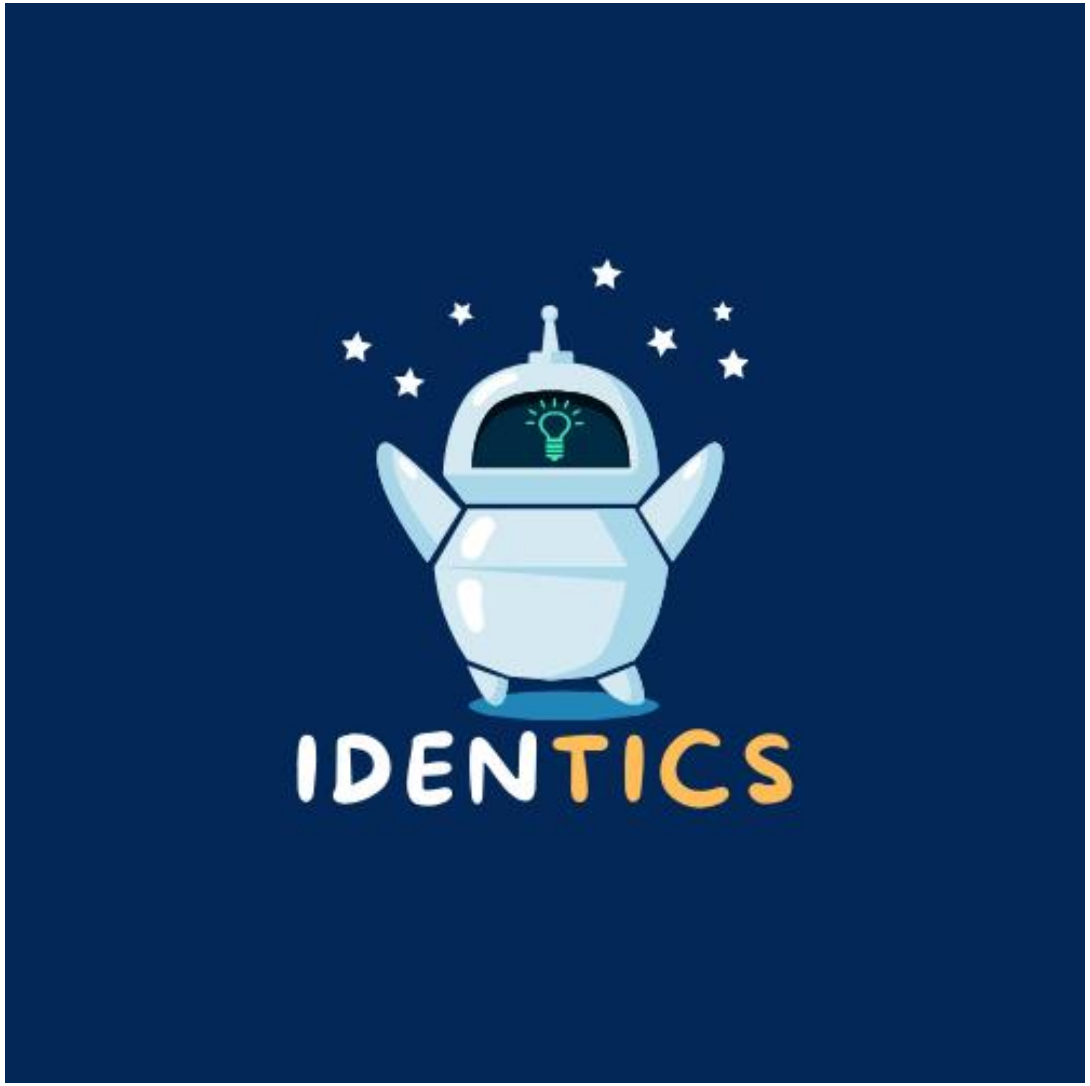
New methods (Artificial Intelligence)



(Loewentern et al. 2025)

IdenTics

Would AI help differentiate between FTLB and tics?



Other news: emerging scales for tics and comorbid conditions

- The MOVES (Motor tic, Obsessions and compulsions, Vocal tic Evaluation Survey): shorter than YGTSS (Lewin et al. 2023)
- The Rush Video-Based Tic Rating Scale-Revised (Riechmann et al. 2023)
- More TS-specific scales
  - The Self-injurious Behavior Scale for Tic Disorders (SIBS-T)(Szejko et al. 2024)
  - The Rage Attack Questionnaire-Revised (RAQ-R) (Müller-Vahl et al. 2020)

There are also other scales…

Review | Open Access | Published: 18 October 2021

European clinical guidelines for Tourette syndrome and other tic disorders—version 2.0. Part I: assessment

Natalia Szejko, Sally Robinson, Andreas Hartmann, Christos Ganos, Nanette M. Debes, Liselotte Skov, Martina Haas, Renata Rizzo, Jeremy Stern, Alexander Münchau, Virginie Czernecki, Andrea Dietrich, Tara L. Murphy, Davide Martino, Zsanett Tarnok, Tammy Hedderly, Kirsten R. Müller-Vahl & Danielle C. Cath

European Child & Adolescent Psychiatry **31**, 383–402 (2022) | Cite this article

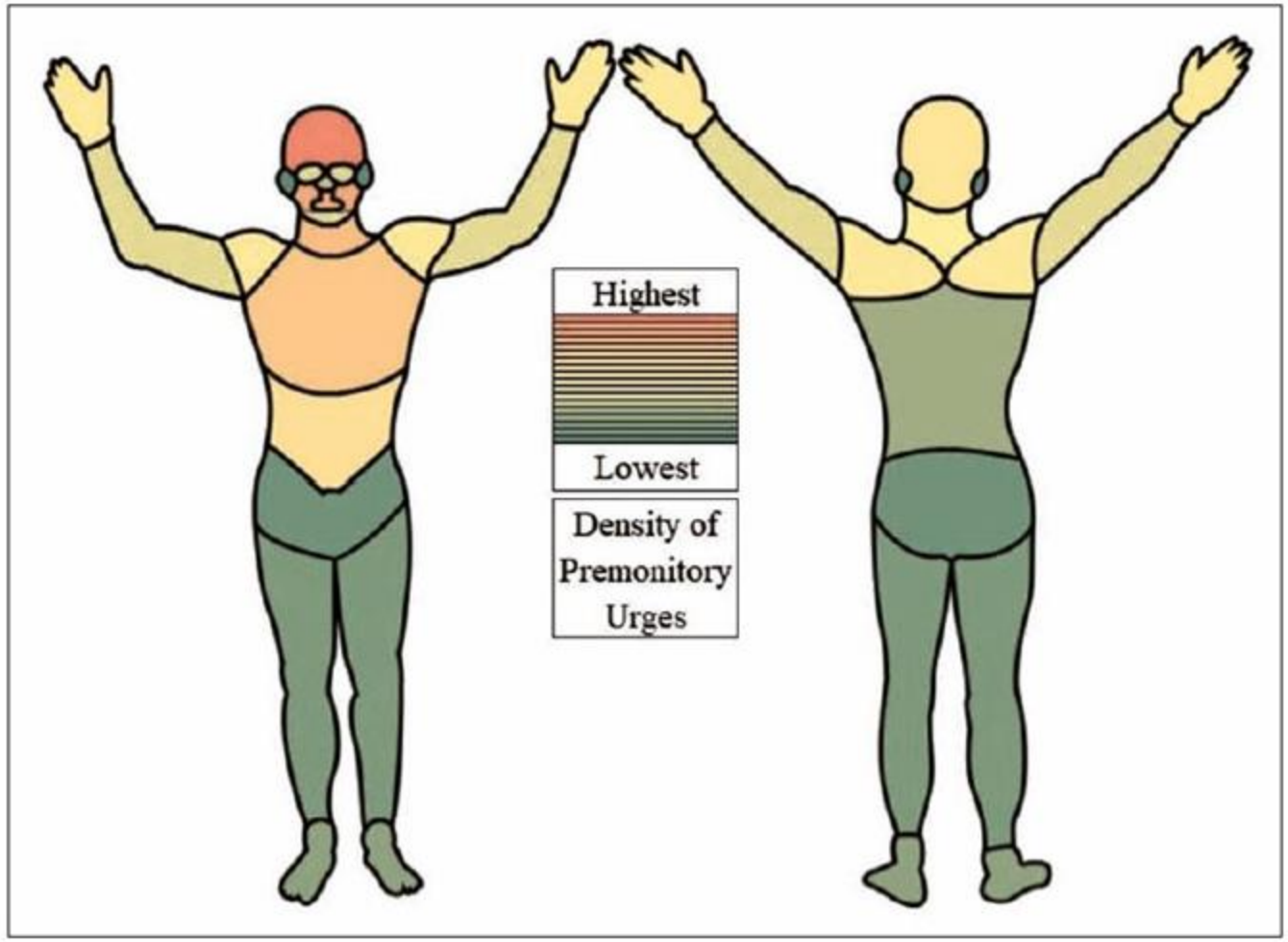
Labels	Parent category	Criteria of TS	Criteria of chronic/persistent vocal and/or motor tic disorder	Criteria of chronic tic disorder	Criteria of provisional/transient tic disorder
DSM-IV-TR	Tourette's disorder; chronic motor or vocal tic disorder; transient tic disorder; tic disorder not otherwise specified	Disorders of infancy, childhood, and adolescence	Multiple motor and one or more vocal tics at some point in illness Tics occur daily or periodically, but 1 year since onset, and no tic-free period of more than 3 consecutive months Onset before 18 years Not caused by substance or other condition	One or more motor or vocal tics present at some point, not both motor and vocal symptoms Tics occur daily or periodically, but 1 year since onset, and no tic-free period of more than 3 consecutive months Onset before 18 years Not caused by substance or other condition No history of TS	One or more motor and vocal tics Tics occur daily or periodically, but for 4 weeks and 12 months Onset before 18 years Not caused by substance or other condition No history of TS Specify if single episode or recurrent
ICD-10	Combined vocal and multiple motor tic disorder (de la Tourette); chronic motor or vocal tic disorder; transient tic disorder; other tic disorders; tic disorder, unspecified	Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	Multiple motor and one or more vocal tics, not necessarily occurring at the same time	One or more motor or vocal tics, but not both types Symptoms occur 12 months	One or more motor and/or vocal tics Symptoms occur 12 months
DSM-5	Tourette's disorder; persistent (chronic) motor or vocal tic disorder provisional tic disorder; other specified tic disorder; unspecified tic disorder	Neurodevelopmental disorders	**Multiple motor and one or more vocal tics at some point in illness** **May wax and wane, but have persisted 1 year since onset** **Onset before 18 years** **Not caused by substance or other condition**	**One or more motor or vocal tics present at some point, not both motor and vocal symptoms** **May wax and wane, but have persisted 1 year since onset** **Onset before 18 years** **Not caused by substance or other condition** **No history of TS** **Specify if motor tics only, vocal tics only**	**One or more motor and/or vocal tics** **Tics present for less than 1 year since onset** **Onset before 18 years** **Not caused by substance or other condition** **No history of TS or persistent tic disorder**
ICD-11	Tourette syndrome (combined vocal and motor tic disorder); persistent (chronic) motor or phonic tics; provisional tic disorder; substance-induced tic disorder; tic disorder due to general medical condition	Disorders of nervous system—primary; mental and behavioural disorders—secondary; obsessive–compulsive and related disorders; neurodevelopmental disorders	One or more motor and/or vocal tics occurring over the same period of time Symptoms occur 12 months	One or more motor and one or more vocal tics Symptoms occur 12 months	One or more motor or vocal tics, but not both types Symptoms occur 2 weeks and 12 months

Szejko et al. Eur Child Adolesc Psychiatry. 2022 Mar;31(3):383-402. doi: 10.1007/s00787-021-01842-2. Epub 2021 Oct 18.

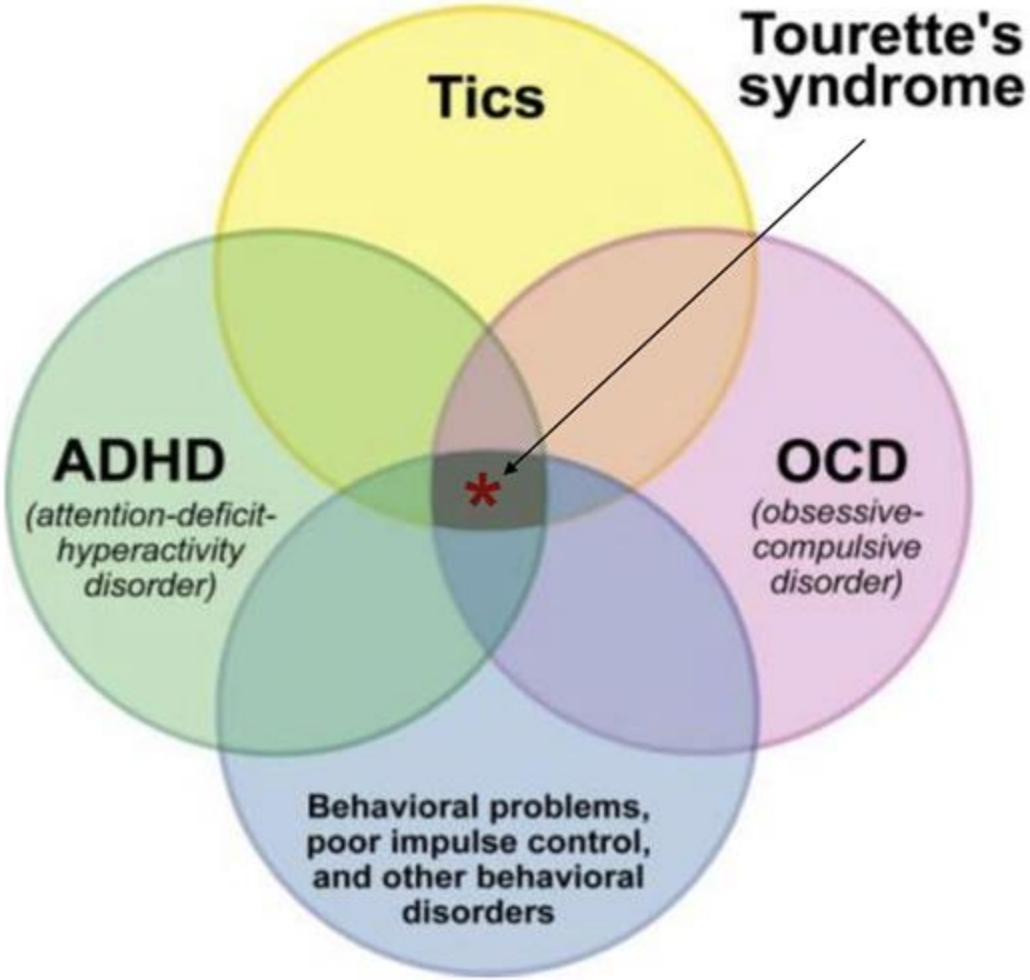
Clinical history

Typical features for tics

- Premonitory urge
- Distractibility
- Suggestibility
- Suppresibility
- Influenced by factors
- Rostrocaudal distribution
- Waxing and waning course
- Onset (age, type)
- Family history
- Profile of comorbidities



Essing et al. 2022



Jankovic, Joseph, Tourette's syndrome. N Engl J Med 2001; 345: 1184-1192

Differential diagnoses

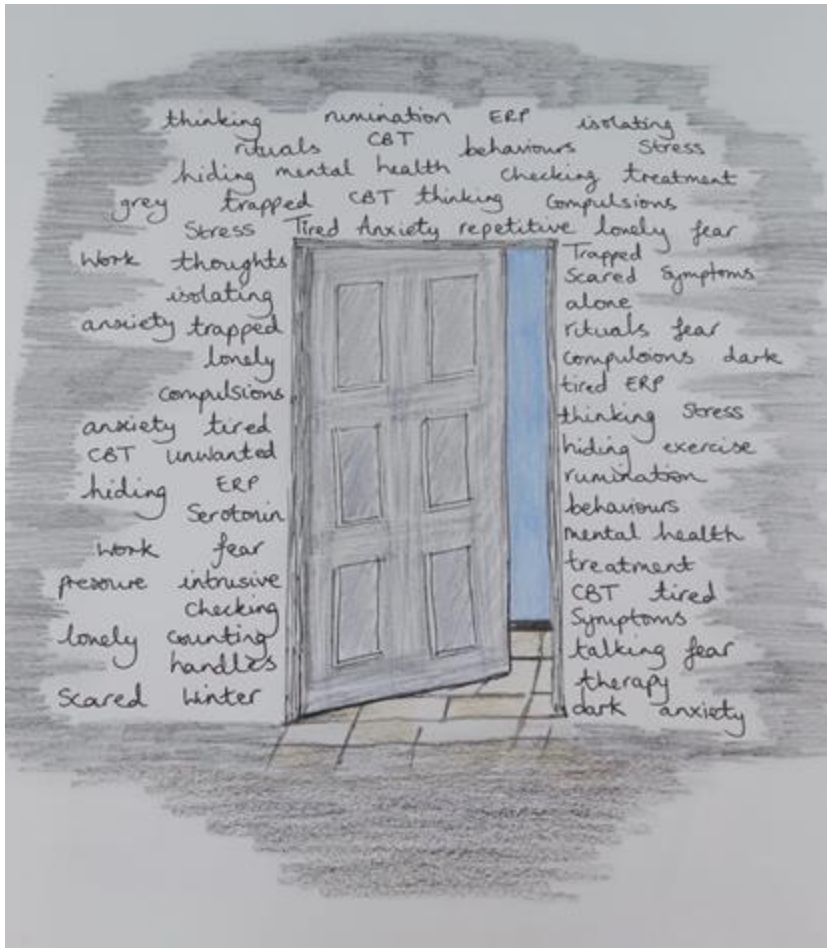
- Somatic conditions
- Compulsions
- Other psychiatric conditions co-existing with tics (self-injurious behaviors, body-focused repetitive behaviors)
- Other movement disorders
    - Stereotypies
    - Myoclonus, chorea, dystonia, hemifacial spasm
- Hypeactivity in ADHD
- Functional tic-like behaviors
- Secondary tics

Somatic conditions

- Ophthalmological (conjunctivitis or dry eye syndrome)
- Otolaryngological (allergy)
- Gastroesophageal reflux
- Stuttering[1]

[1]Nilles et al, 2023

Compulsions

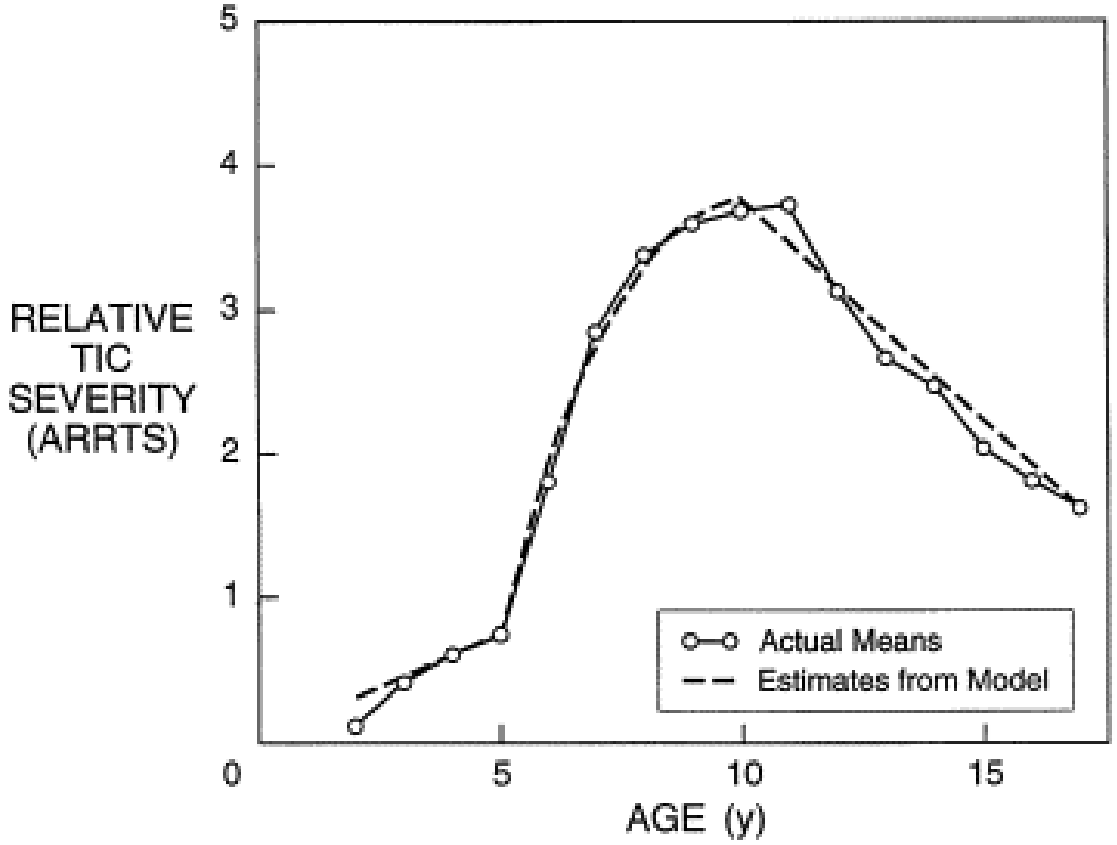


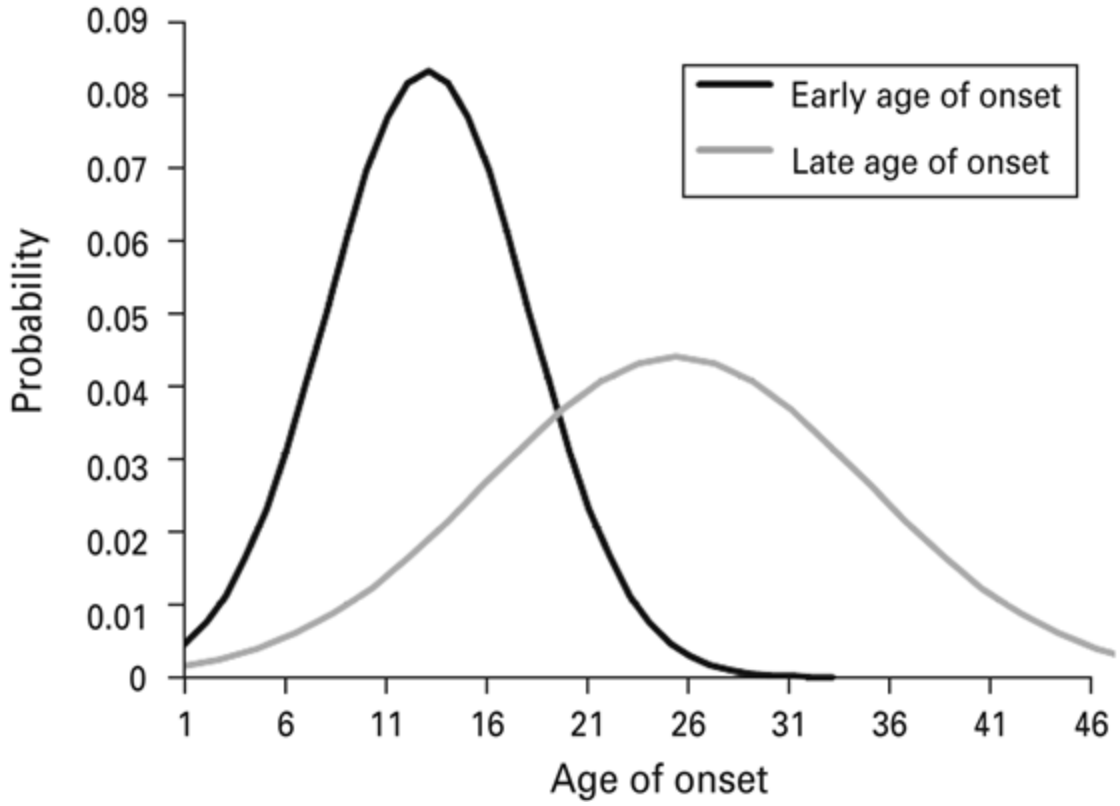
Repetitive and intrusive behaviours

Tics	Compulsions
Sudden, short	Ritualized, can be lengthy
Fragmented movements	Goal-directed behavior
Premonitory urges	Obsessions
Less related to anxiety	Mostly related to anxiety
Onset in primary school	Onset after primary school
Waxing and waning	More stable over time

Lewin et al. Psychiatry Res. 2010 Jul 30; 178(2): 317–322.

Onset of tics vs OCD





Bloch and Leckman. J Psychosom Res. 2009 Dec;67(6):497-501. doi: 10.1016/j.jpsychores.2009.09.002.

Anholt et al. Psychol Med. 2014 Jan;44(1):185-94. doi: 10.1017/S0033291713000470. Epub 2013

Tic-related compulsive behaviours

- Can be close phenomenologically with compulsions
- E.g. touching, tapping, grooming, evening-up[1,2]
- More common in patients with co-existing tics and OCD.[3]

[1]Leckman J F et al., 1994, [2]Worbe et al., 2010, [3]Cath et al, 2001

Self-injurious behaviors (SIB)

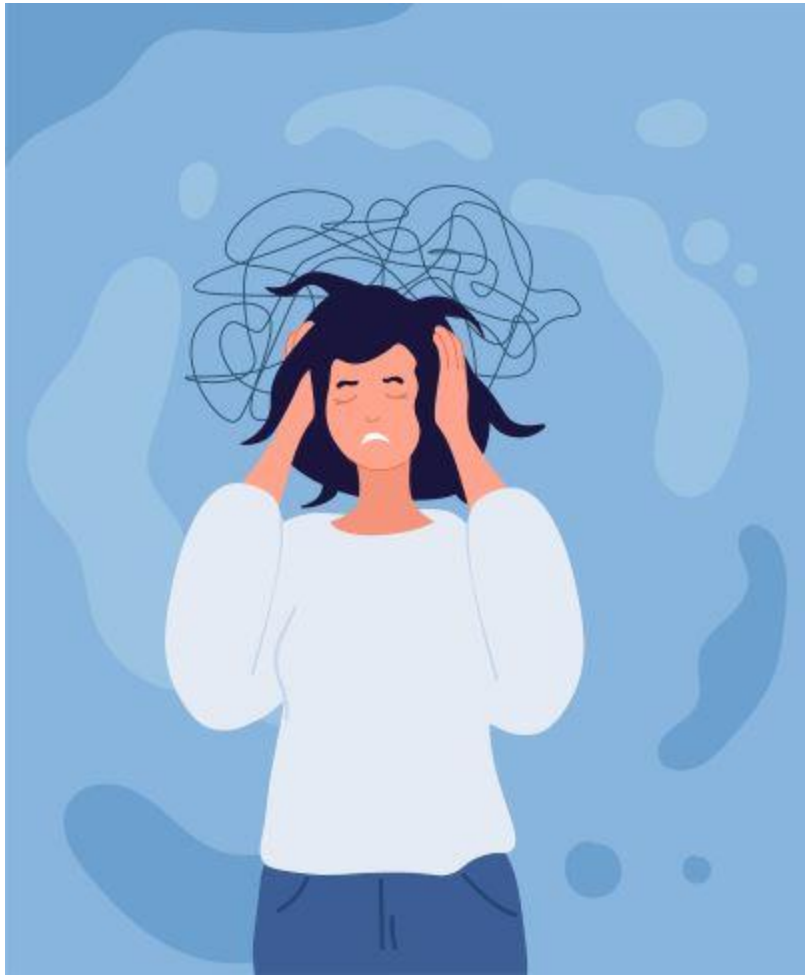
- General population: mainly associated with **impulse control disorder**, **OCD**, **borderline personality disorder**
- Various frequency in TS (4-23%)
- Have been speculated to be part of **tics** or **OCD** in TS

- Recent research shows that they seem to be closer to **tics** than OCD in TS (Szejko et al. 2024)
- Complex tics (YGTSS) or separate phenomena?
- **Higher disease severity**

Mathews et al. 2003; Szejko et al. 2019

Body-focused repetitive behaviors (BFRB)

- BFRB mainly classified as **OCD** and/or **impulse control disorder** (ICD)
- Most frequent types of BFRB in patients with tics are (Rylska et al. 2025): **trichotillomania, dermatillomania,onychotillomania, onychophagia**
- BFRB especially frequent in patients with more **severe tics**, comorbid **ADHD** and **OCD** (Rylska et al. 2025; Szejko et al. 2025)
- **HRT** could be beneficial both for tics and BFRB (Moritz et al. 2023)
- BFRB especially in patients with severe tics
- Maybe type of complex tics?



Stereotypies

Common repetitive complex motor behaviors, during the neurodevelopmental period +

- Patterned, seemingly purposeless
- Predictable amplitude and location
- **Long periods of time**, multiple times a day, at the expense of other movements.[1,2,3]
- **Cease any other activity.**
- Last from seconds to minutes[2]
- **Comfort and enjoyment**
- Unaware, limited contact with the surrounding environment.[4]

The repertoire of stereotypies may vary considerably.

- nail biting
- thumb sucking
- tapping one's feet
- arm and hand movements (flapping, shaking, waving…)
- pacing.[3]

[1]Edwards et al., 2012, [2]Harris et al., 2008, [3]Melo et al, 2020, [4]Singer, 2009

Stereotypies or tics?

	Repetitiveness	Goal-directed	Volitional control	Sensory antecedent	Emotional antecedent	Cognitive-ideational antecedent
Tics	++ (occur in discrete bouts)	–	++	+++	+	–
Stereotypies	+++ (occur unchanged for long periods of time)	–	+	– Rewarding sensations may occur after the motor behavior	–	–

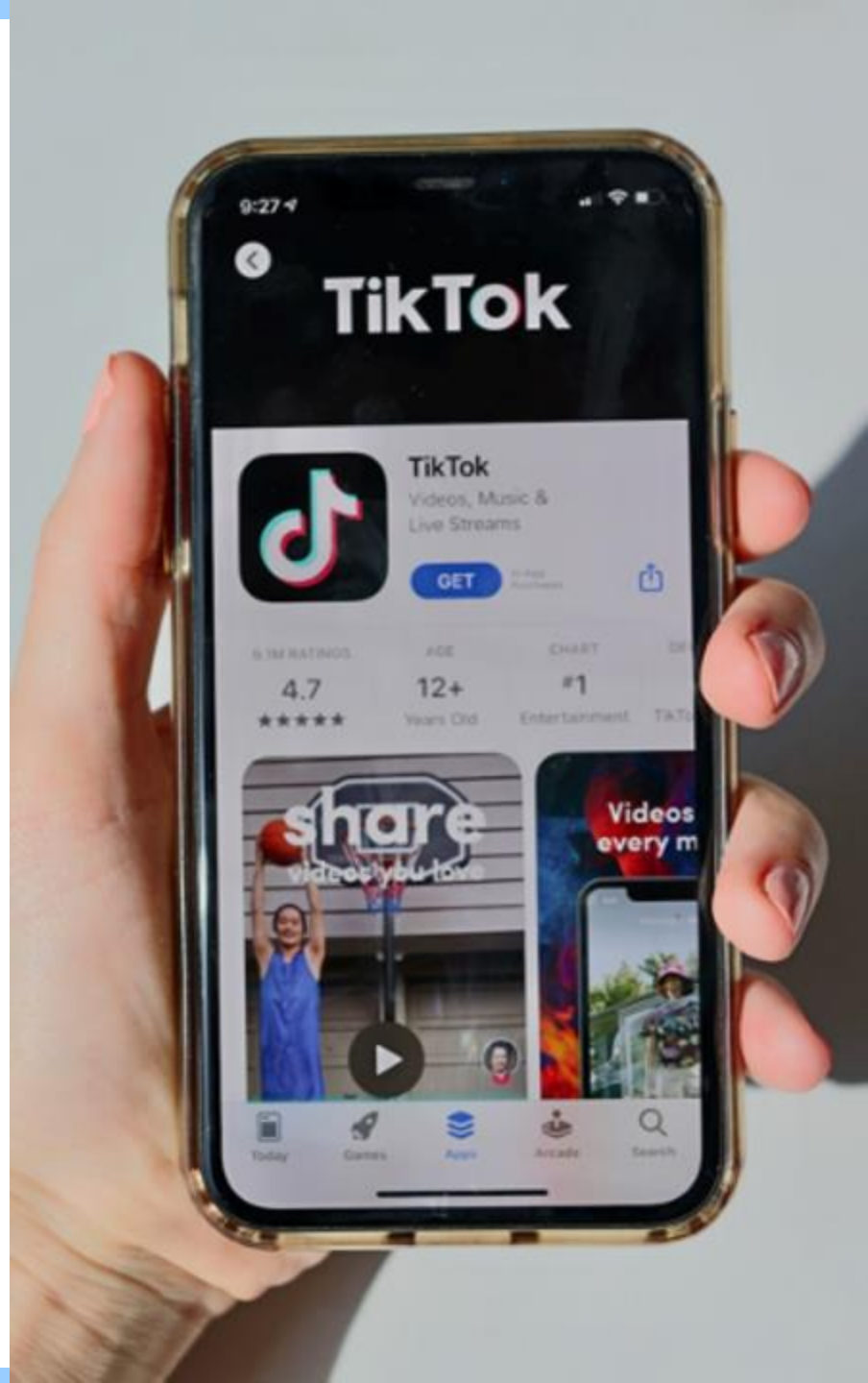
Source: Adapted from Martino D, Espay A, Fasano A, Morgante F. Disorders of Movement: A Guide to Diagnosis and Treatment. Springer; 2015.

Functional tic-like behaviours (FTLBs)

Movements or vocalizations that resemble tics.

Unlike Tourette syndrome:

- **Late** and **rapid** onset
- Large-amplitude arm movements, self-injurious behaviour, **coprophenomena**, bizarre words and phrases.
- **Complex tics** > simple tics
- May be influenced by popular references **(TikTok).**



Pringsheim et al., 2021; Müller-Vahl et al., 2021

Functional tic-like behaviors

Review > Eur J Neurol. 2023 Apr;30(4):902-910. doi: 10.1111/ene.15672. Epub 2023 Jan 13.

European Society for the Study of Tourette Syndrome 2022 criteria for clinical diagnosis of functional tic-like behaviours: International consensus from experts in tic disorders

Tamara Pringsheim [1], Christos Ganos [2], Christelle Nilles [1], Andrea E Cavanna [3 4 5], Donald L Gilbert [6 7], Erica Greenberg [8], Andreas Hartmann [9], Tammy Hedderly [10], Isobel Heyman [11], Holan Liang [11], Irene Malaty [12], Osman Malik [13], Nanette Mol Debes [14 15], Kirsten Muller Vahl [16], Alexander Munchau [17], Tara Murphy [11], Peter Nagy [18], Tamsin Owen [10], Renata Rizzo [19], Liselotte Skov [20], Jeremy Stern [21], Natalia Szejko [22], Yulia Worbe [23], Davide Martino [1]

Affiliations + expand

PMID: 36587367 DOI: 10.1111/ene.15672

How to diagnose FTLBs

Clinically definite diagnosis : 3 major criteria

Clinically probable diagnosis : 2 major criteria + 1 minor criterion

Major criteria	Age onset ≥ 12 yr
	Rapid onset and evolution of symptoms
	Phenomenology : 4/9
Minor criteria	Comorbid depression or anxiety disorder
	Other functional neurological symptoms/ somatoform disorders

Pringsheim et al, 2022

Complex > simple tic-like behaviours
Variable reproduction
Complex tic-like behaviours: banging chest/head, tapping, hitting others, sign language, throwing objects, offensive gestures, drop attacks, context dependent, self- injury or injury to others
Do not to follow the typical rostrocaudal progression
Coprolalia, context-dependant words, statements
Popular culture references
Large variation in symptom frequency and intensity in a day
Tic-like behaviours change rapidly
More tic-like behaviours during the examination

Other movement disorders

- Chorea
- Dystonia
- Hemifacial spasm

Secondary tics

- **Exposure to drugs** (neuroleptics) **and toxic substances** (cocaine)[1-4]
- **Neurodegenerative illnesses** (Huntington, neuroacanthocytosis, NBIA)
- **Acute brain lesions** (vascular, trauma)[5,6]
- **Infectious causes** (VZV, HSV) & **immune-mediated conditions** (postviral encephalitis)

Clues :

- A late age of onset of tics without a prior/family history of tics
- An abrupt onset
- An association with other neurological manifestations.

[1]Pascual-Leone & Dhuna, 1990, [2]Gershanik & Gómez Arévalo, 2011, [3]Ganos & Martino, 2015, [4]Peters et al., 2021, [5]Mehanna & Jankovic, 2013, [6]Ricketts et al., 2019, [7]Badenoch et al., 2021

Multicenter Study > Neurology. 2021 Mar 23;96(12):e1680-e1693.
doi: 10.1212/WNL.0000000000011610. Epub 2021 Feb 10.

Association of Group A *Streptococcus* Exposure and Exacerbations of Chronic Tic Disorders: A Multinational Prospective Cohort Study

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Our approach to the patient with tic disorders

- What was the primary reason for referral? (tics, comorbidities?)
- History of pregnancy and birth
- Developmental milestones
- Past medical history
- Family history
- Overview of the medication
- Social history

History of tics

- When was the onset?
- What was the first/were the first tics? Course?
- What are the current tics? (YGTSS)
- Other typical features for tics (PU, suppressibility, distractibility, suggestibility)
- Factors influencing tics
- Medication for tics, behavioral therapy
- History of comorbidities (ADHD, OCD, depression, anxiety, rage attacks, sleeping problems)

Examination

- Height, weight, waist circumference
- BP and HR in supine and standing position
- Neurological examination

Thank you for your attention!

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Assessment of tics and differential diagnosis

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