

TIKTOK AND TICS: THE POSSIBLE ROLE OF SOCIAL MEDIA IN THE EXACERBATION OF TICS DURING THE COVID LOCKDOWN

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TIKTOK ÉS TICEK: A KÖZÖSSÉGI MÉDIA LEHETSÉGES SZEREPE A TICEK EXACERBÁCIÓJÁBAN A COVID-JÁRVÁNY ALATT

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Background and purpose – Over the past year, many cases with newly onset or significantly exacerbated tic disorders were observed worldwide, where some aspects of the clinical presentation or the symptomatology were atypical for established tic diagnoses. Our purpose was to describe the atypical cases and raise relevant diagnostic issues.

Methods – Consecutive cases with atypical tic presentations were documented.

Results – Five atypical tic cases are described. These cases shared some common characteristics, most notably the fact that all of them had been exposed to online presentation of ticking behaviour on social media platforms prior to the de novo development or exacerbation of their tics.

Discussion – Even though the order of events suggests causality and therefore the diagnosis of a functional tic disorder, unambiguous criteria for classifying atypical tics as functional symptoms are lacking. Differentiating neurodevelopmental and functional tics in childhood is currently problematic.

Conclusion – Based on the currently unresolved issues in differential diagnosis, the importance of watchful waiting and behavioural interventions is highlighted to avoid unwarranted pharmacotherapy.

Keywords: tic, Tourette, social media, functional neurological symptom disorder, conversion disorder

Háttér és cél – Az elmúlt év során világszerte többször jelentek meg újonnan kialakult vagy jelentősen súlyosbodott tictüneteket mutató esetek, amelyeknél a klinikai kép vagy a tünetek bizonyos aspektusai nem feleltek meg a ticzavarok hivatalos kritériumainak. Célunk a saját gyakorlatunkban előforduló atípusos esetek leírása és a felmerülő diagnosztikai problémák felvetése.

Módszerek – Az egymás után megjelenő atípusos tice eseteket dokumentáltuk.

Eredmények – Öt atípusos ticesettel találkoztunk. Az esetek néhány közös jellegzetességgel rendelkeztek, kiemelten azzal, hogy az anamnézisben a ticek de novo kialakulását vagy exacerbációját megelőzően a betegek tictüneteket néztek közösségi médiafelületeken.

Megbeszélés – Habár az események sorrendje oksági kapcsolatra, ebből következően funkcionális ticzavar diagnózisára utal, a funkcionális tünet diagnózisához nem állnak rendelkezésre egyértelműen alkalmazható kritériumok. A neurodevelopmentális és funkcionális ticek elkülönítése gyermekkorban sok problémát vet fel.

Következtetés – A differenciáldiagnosztikai hiányosságok miatt a beavatkozás nélküli betegkövetés és viselkedésterápiás eszközök alkalmazása javasolt a szükségtelen gyógyszeres kezelés elkerülése érdekében.

Kulcsszavak: tic, Tourette, közösségi média, funkcionális neurológiai tünet zavar, konverziós zavar

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Tics are repetitive, stereotypical, excessive movements or vocalizations. They are perceived as involuntary, although a certain degree of suppressibility sets tics apart from other disorders characterized by extra movements, like myoclonus or chorea. Further blurring the line between involuntary and volitional phenomena is the possible appearance of so-called functional (or psychogenic; in this paper we will refer to them as functional) tics, which are thought to have a different aetiology from tic disorders¹. Certain characteristics that diverge from the typical course and presentation of tic disorders point to a possible functional aetiology. The frequency of atypical, possibly functional tics appears to have increased during the COVID-19 pandemic in 2020 and 2021^{2, 3}. In this period, especially during and after the 3rd wave of the COVID-19 pandemic in Hungary, we saw several patients with atypical tics, some of whose clinical features suggested a functional aetiology. In this paper, we present five consecutive, possibly functional, tic cases where social media plays a potential role in the development and exacerbation of these symptoms.

Case descriptions

CASE 1

The 16-year-old girl was referred to our hospital for involuntary motor and vocal symptoms. History: Her family history was negative for tic disorders and other psychiatric disorders. Her medical history includes dizziness at age 14; assessments did not reveal any organic causes and the symptom resolved spontaneously.

Symptoms at admission: When admitted to our neurology ward in January, 2021, she reported that she had been experiencing involuntary symptoms since August, 2020: head rolls, repetition of words, eye rolling, and hand jerks; with an abrupt worsening in her symptoms at a New Year's Eve party. Afterwards, she had attacks of these symptoms lasting for 20 to 25 minutes. She recorded one of these attacks on video to be shared on TikTok later; the video showed continuous motor and vocal symptoms while she was talking about her experiences, but the symptoms stopped when she was reaching for the phone to turn off the recording. She did not report any premonitory urges. Her symptoms largely resolved within a day after the admission, and were barely observed or reported during her inpatient stay. EEG, cranial MRI, and serum autoimmune panel exams showed no abnormalities.

A child psychiatric consultation with a tic specialist took place on February 16, about 6 weeks after the abrupt worsening of her symptoms. She and her mother did not report any symptoms since her discharge from the hospital (January 24, 2021) (Yale Global Tic Severity Scale/YGTSS Total Tic Score was 0). On inquiry, it was revealed that for months before her first symptoms appeared, she had been following the daily life of a young person with Tourette's syndrome on the TikTok video sharing platform.

Medical opinion: Although the cross-sectional appearance of the symptoms corresponded to tics, the sudden appearance and remission of the symptoms, the unusual age of onset, her gender, the way voluntary actions appeared to temporarily suspend the symptoms, and the readiness to publicly display her symptoms were not typical for tic disorder categories.

She was followed up in March, and it was reported that her symptoms had never returned.

CASE 2

The 10-year-old female patient was referred to our hospital's emergency unit for sudden-onset motor symptoms.

History: In 2019, at age 9, she was hospitalized for a sudden-onset tic-like vocalization (throat clearing), which spontaneously remitted within a month. Immediate family members were infected by COVID-19 virus in March, the patient did not have any symptoms and was not tested for the infection. Family history was negative for neurological and psychiatric disorders, including epilepsy, tics, attention deficit/hyperactivity disorder (ADHD) and obsessive-compulsive disorder (OCD).

Symptoms at admission: In April, 2021 she was hospitalized for sudden-onset involuntary motor symptoms (shoulder, leg, and whole-body jerks) which first appeared about 2 weeks before, at bedtime. After a few days, the frequency of these symptoms significantly increased and was present all day. The patient's YGTSS Total Tic Score was 9 at admission. The patient reported that symptoms decreased when performing a voluntary action, like eating. She was not able to voluntarily suppress the symptoms and did not report any premonitory sensations or urges. Her neurological exam was negative. EEG showed normal background activity with no epileptiform signs. Her blood test and COVID-19 serology test results were negative.

Medical opinion: Based on the atypical appearance of the initial symptoms (only at bedtime), the atypical age at the first symptoms (9 years old), the

female gender, the relatively abrupt onset, the distractibility, the lack of premonitory sensations and the inability to suppress the tics, functional etiology was suggested. A potential factor in the possible functional symptom generation was that she was a passionate online follower of *Billie Eilish*, a pop star immensely popular among pre-teen and teenage children, who is open about her Tourette's disorder.

Follow-up information was not available, as the patient could not be reached at the contact details provided by the family.

CASE 3

The 14.5-year-old girl was referred to our clinic for newly onset motor and vocal symptoms.

History: Her family history was negative for neurological or psychiatric disorders. Her medical history was uneventful.

Symptoms at admission: Her first motor symptom (head jerk) appeared in January 2020, and continued to reappear about once a month. In April, 2021, the number and frequency of symptoms increased: symptoms were present almost continuously, and neck stretches, head jerks, squeaks, sniffles, whistles, mouth clicks and smacks, occasional rhythmic shaking of the legs emerged. She could suppress the symptoms for short periods. Since the motor symptoms made her nauseous, the patient avoided eating and lost 4 kg. Her symptoms interfered with speaking and writing. She also reported a constant tension-type headache since the beginning of April. She was admitted to the neurological ward on April 19, 2021. The Total Tic Severity Score of the YGTSS was 27. When asked about social media use, the patient reported that she had contacted and was following a girl with Tourette's syndrome on TikTok. Her neurological status was negative. Cranial MRI showed no abnormalities. EEG during wakefulness showed normal activity. Laboratory results showed a mildly elevated antistreptolysin titer, but the throat swab culture was negative. Although the current symptoms had not been preceded by any signs indicative of an infection, due to the antistreptolysin titer elevation, a course of penicillin was administered, but her symptoms remained unchanged. A psychiatric consultation was requested and haloperidol was recommended.

Medical opinion: Based on the unusual age of onset, her gender, the potential online influence and the complete lack of effectiveness of medication, the possibility of a functional aetiology was suggested.

Follow-up: After a month, the pharmacotherapy did not reduce the symptoms and it was discontinued. As her symptoms were largely unchanged, behavioural treatment was recommended.

CASE 4

The 12-year-old girl was hospitalized with increasingly intensive numbness, dizziness and tremor, which changed to tics during her inpatient stay.

History: Her family history includes transient tic-like symptoms in several male relatives. The family history is otherwise negative for neurological and psychiatric disorders. Her medical history was uneventful.

Symptoms at admission: On April 12, 2021, the patient developed dizziness, numbness in the left forearm, and tremor in the head and neck muscles. The intensity and duration of her symptoms increased, so she was hospitalized. Physical and neurological examination did not find anything abnormal. Laboratory tests and blood pressure values were normal, ophthalmological and ear-nose-throat examinations did not reveal any abnormalities. Her EEG was normal. Psychological examination described anxiety and lower-than-average mood.

On the 3rd day of her hospitalization, her symptoms changed: eye blinking, tongue clicking, head and neck jerks, and shoulder shrugs appeared, and the dizziness, numbness and tremor disappeared. Tiapride was started and the patient was discharged with diagnoses of anxiety disorder and transient tic disorder. It is important to note that her roommate at the hospital displayed similar symptoms (also reported here, see Case 3), they soon became friends and watched TikTok videos of people with tics together.

A child psychiatric consultation took place approximately one and a half months later (June, 2021). The YGTSS Total Tic Score was 19 at the time. The parent and child reported that her tic-like symptoms significantly improved the day after discharge but had not improved any further, even though the dose of the medication had since been increased. The patient did not report any specific premonitory urges, and she was unable to suppress the symptoms. After in-person education was re-initiated in May, she felt disturbed by other students noticing her symptoms, and her parents decided to keep her home-schooled until the end of the school year.

Medical opinion: Although the cross-sectional appearance of the symptoms and the positive family history suggested a tic disorder, the age at the

first symptoms, the abrupt symptom onset, the female gender, the vague neurological symptoms preceding the tic-like phenomena, the concurrent psychological symptoms, her roommate's very similar symptoms, questionable or no response to medication, the inability to suppress the symptoms, the lack of premonitory urges, and the benefit associated with symptoms (exemption from school attendance) were in favour of a functional aetiology. Therefore, a gradual withdrawal of the drug and behavioural therapy were recommended.

Follow-up: For 2 months, her symptoms remained unchanged, then, as abruptly as they appeared, they resolved and had not returned until the finalization of the manuscript.

CASE 5

The 15-year-old female patient was referred to our clinic for involuntary motor symptoms.

History: No information was available about the family history, as the patient was adopted. Her medical history included hand and arm tremors at age 4; no neurological abnormalities were found and no treatment was recommended; the tremor gradually disappeared. She had repeatedly developed low-grade temperature increases since kindergarten, the cause could never be established. During the 2020 spring lockdown, the patient's mood worsened, and she received a few months of psychotherapy.

Symptoms at admission: She was hospitalized in April for the reappearance of her hand and arm tremors, and along with them, the emergence of involuntary movements (head and shoulder jerks) accompanied by varying vocalizations (sometimes simple noises, sometimes words). Physical and neurological exams, an EEG and laboratory exams were performed, none of them revealed anything abnormal, so she was discharged and psychiatric consultation was recommended.

The child psychiatric consultation took place in June. YGTSS Total Tic Score was 11 at the time. By June, the tremor had completely disappeared and her tic-like symptoms had largely ameliorated. When asked about potential social media influences, the patient stated she loved Billie Eilish and had actively researched online for the symptoms of Tourette's.

Medical opinion: Based on her age at symptom onset, her gender, the atypical presentation (same movements accompanied by varying vocalizations), the presence of other functional motor symptoms and the potential social influence, an atypical

tic disorder was diagnosed and a functional aetiology was suggested.

Follow-up: A month after the consultation, none of the symptoms were present.

Discussion

In the first half of 2021, we saw several patients with involuntary motor and vocal symptoms that did not fit into the usual presentation or course of a tic disorder and shared some common characteristics. They were all female, their symptoms were accompanied by vague somatic or neurological complaints, their symptoms had an abrupt start or exacerbation, and none of the patients reported premonitory urges associated with the symptoms. None of them were able to suppress the symptoms and medication, if tried, was ineffective. The symptoms of all patients reached a severity warranting hospitalization during the lockdown. Finally, all patients had observed ticking behaviour online or in person before their first symptoms appeared.

Although individual cases can differ significantly from each other, tic disorders show remarkable similarity all over the world⁴. Certain characteristics, like an atypical course, the lack of premonitory urges, the inability to suppress tics, female gender, the presence of other functional motor symptoms, the lack of efficacy of usually effective medications, the lack of tics in the family history, the absence of the usual rostrocaudal symptom distribution, interference with voluntary actions, absence or atypical appearance of palin-, echo-, and coprophenomena, and the lack of the typical waxing and waning of the symptoms may indicate psychological, rather than neurodevelopmental reasons^{1, 5}. Also, functional (ie. not neurodevelopmental) tics often have an abrupt onset or are triggered by a specific event, which is not usual for tics; patients with tics tend to try to camouflage their symptoms, whereas patients with functional tics usually do not⁶. It has also been suggested that if neurological symptoms are alleviated by psychological methods, it means they are functional⁷.

It is important to recognize, however, that the previously listed characteristics are based on statistical probability, so certain atypical features in an individual patient do not prove that the symptoms are functional. For example, symptom onset does usually occur before or around the beginning of school, with 93% of patients displaying their first symptoms by age 10; however, about 6% of patients develop their first tics between ages 10 and

15, and a further 1% will experience tic onset after 15 years of age⁸. Males are usually more likely to develop tics than females, but the female-to-male ratio varies significantly (from 1:10 to 1:3) in different studies⁸, and for transient tics lasting no more than 1 or 2 months, the female-to-male ratio was as low as 1:1.6⁹. Similarly, it is well known that medications do not work for all patients with a tic disorder, or that many patients, especially children, do not experience premonitory urges¹⁰. As for using the effectiveness of psychological treatment to classify tics as functional, the most recent guideline of the American Academy of Neurology (AAN)¹¹ found higher confidence in the evidence for the efficacy of behavioural treatment in tic reduction than for the efficacy of any medication. The fact that exposure to tics presented on social media platforms, especially TikTok, before symptom exacerbation is frequently featured in the history of atypical cases all over the world has led several authors to suggest a relationship^{2,3}. However, suggestibility has long been known as a core trait of tics¹², such a fundamental one that an expert guideline, based on a systematic review, uses it as a criterion to classify medically unexplained chronic cough as a tic cough (and not a habit or psychogenic cough)¹³. A recently published study about group behavioural interventions for tics noted that some (primarily vocal) tics actually worsened during the treatment period, a phenomenon attributed to the high reactivity of some tics to socially mediated reinforcers¹⁴. The way social media may affect tics has not been systematically studied yet, but it is likely that even though the interaction occurs through a screen, suggestibility and socially mediated reinforcement work just the same. In fact, it has been

demonstrated that tics increase when patients watch a video recording of tics¹⁵.

Currently, no single criterion used for making the distinction between functional tic-like movements and tics can unequivocally set the two groups apart¹. Usually, the final decision is based on the sum of all symptoms, however, the number of present or missing clinical features required to make a final decision has not been established, and it is not known if any of these features carry more weight than others¹. Features nudging the clinician towards the suspicion of a functional tic disorder are often not explicitly incompatible with a neurodevelopmental diagnosis, only represent a significantly less likely, but still established subpopulation of patients.

Conclusion

An unambiguous distinction between tics and their functional counterparts in children is currently impossible. However, it seems that the presentation of tics by social media influencers, especially during a period of scarcity of the normal in-person social stimuli, may lead to the development or exacerbation of tics (or tic-like movements) in children watching these videos. A systematic look into the matter clarifying whether this relationship actually exists and if so, what mechanisms play a role, is necessary. Until then, paediatric experts working in neurology or mental health services should place special emphasis on the collection of accurate and detailed information about the tics or tic-like symptoms of their patients, and, in accordance with the 2019 AAN guideline¹¹, watchful waiting and behavioural interventions should precede pharmacological treatment.

REFERENCES

1. Ganos C, Martino D, Espay AJ, Lang AE, Bhatia KP, Edwards MJ. Tics and functional tic-like movements: Can we tell them apart? *Neurology* 2019;10:1212/WNL.0000000000008372. <https://doi.org/10.1212/WNL.0000000000008372>
2. Heyman I, Liang H, Hedderly T. COVID-19 Related increase in childhood tics and tic-like attacks. *Arch Dis Child* 2021;106(5):420-1. <https://doi.org/10.1136/archdischild-2021-321748>
3. Hull M, Parnes M, Jankovic J. Increased incidence of functional (psychogenic) movement disorders in children and adults amidst the COVID-19 pandemic: A cross-sectional study. *Neurol Clin Pract* 2021;10:1212/CPJ.0000000000001082. <https://doi.org/10.1212/CPJ.0000000000001082>
4. Knight T, Steeves T, Day L, Lowerison M, Jette N, Pringsheim T. Prevalence of tic disorders: a systematic review and meta-analysis. *Pediatr Neurol* 2012;47(2):77-90. <https://doi.org/10.1016/j.pediatrneurol.2012.05.002>
5. Baizabal-Carvallo JF, Jankovic J. The clinical features of psychogenic movement disorders resembling tics. *J Neurol Neurosurg Psychiatry* 2014;85(5):573-5. <https://doi.org/10.1136/jnnp-2013-305594>

6. *Dreissen YE, Cath DC, Tijssen MAJ.* Functional jerks, tics, and paroxysmal movement disorders. In *Handbook of Clinical Neurology*. Elsevier 2016;139:247-58. <https://doi.org/10.1016/B978-0-12-801772-2.00021-7>
7. *Fahn S.* Psychogenic movement disorders. In *Hyperkinetic Movement Disorders*; John Wiley & Sons, Ltd, 2005. pp. 375-84. <https://doi.org/10.1002/9781444346183.ch24>
8. *Freeman RD, Fast DK, Burd L, Kerbeshian J, Robertson MM, Sandor P.* An international perspective on Tourette syndrome: Selected findings from 3500 individuals in 22 countries. *Dev Med Child Neurol* 2007;42(7):436-47. <https://doi.org/10.1111/j.1469-8749.2000.tb00346.x>
9. *Snider LA, Seligman LD, Ketchen BR, Levitt SJ, Bates LR, Garvey MA, et al.* Tics and problem behaviors in schoolchildren: Prevalence, characterization, and associations. *PEDIATRICS* 2002;110:331-6. <https://doi.org/10.1542/peds.110.2.331>
10. *Banaschewski T, Woerner W, Rothenberger A.* Premonitory sensory phenomena and suppressibility of tics in Tourette syndrome: Developmental aspects in children and adolescents. *Dev Med Child Neurol* 2007;45(10):700-3. <https://doi.org/10.1111/j.1469-8749.2003.tb00873.x>
11. *Pringsheim T, Holler-Managan Y, Okun MS, Jankovic J, Piacentini J, Cavanna AE, et al.* Comprehensive systematic review summary: Treatment of tics in people with Tourette syndrome and chronic tic disorders. *Neurology* 2019;92(19):907-15. <https://doi.org/10.1212/WNL.0000000000007467>
12. *Leckman JF.* Phenomenology of tics and natural history of tic disorders. *Brain Dev* 2003;25:S24-S28. [https://doi.org/10.1016/S0387-7604\(03\)90004-0](https://doi.org/10.1016/S0387-7604(03)90004-0)
13. *Vertigan AE, Murad MH, Pringsheim T, Feinstein A, Chang AB, Newcombe PA, et al.* Somatic cough syndrome (previously referred to as psychogenic cough) and tic cough (previously referred to as habit cough) in adults and children. *Chest* 2015;148(1):24-31. <https://doi.org/10.1378/chest.15-0423>
14. *Zimmerman-Brenner S, Pilowsky-Peleg T, Rachamim L, Ben-Zvi A, Gur N, Murphy T, et al.* Group behavioral interventions for tics and comorbid symptoms in children with chronic tic disorders. *Eur Child Adolesc Psychiatry* 2021. <https://doi.org/10.1007/s00787-020-01702-5>
15. *Herrmann K, Sprenger A, Baumung L, Alvarez-Fischer D, Münchau A, Brandt V.* Help or hurt? How attention modulates tics under different conditions. *Cortex* 2019;120:471-82. <https://doi.org/10.1016/j.cortex.2019.06.016>