CASO CLÍNICO/CASE REPORT

# Tics, Functional Tics, TikTok and COVID-19: A Pediatric Case Report

## Tiques, Tiques Funcionais, TikTok e COVID-19: Caso Clínico Pediátrico

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## Abstract

Functional tics are a rare manifestation of the spectrum of functional neurological disorders. The phenomenological similarity with organic and simulated pathology poses important diagnostic challenges, but they should not be considered a diagnosis of exclusion. Recently there have been sudden outbreaks of bizarre tics in adolescent girls during the confinement imposed by the COVID-19 pandemic, whose appearance seems to be related to the use of TikTok application and for which we intend to alert, through a clinical case illustrated with a video.

## Resumo

Os tiques funcionais são uma manifestação rara do espectro dos distúrbios neurológicos funcionais. A semelhança fenomenológica com patologia orgânica e simulada coloca importantes desafios diagnósticos, mas não devem ser considerados diagnóstico de exclusão. Recentemente têm-se observado surtos de tiques bizarros súbitos em raparigas adolescentes durante o confinamento imposto pela pandemia COVID-19, cujo surgimento parece relacionado com a utilização da aplicação TikTok e para os quais pretendemos alertar, através de um caso clínico ilustrado com vídeo.

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## Introduction

Functional movement disorders (FMD) affect both adults and children and are part of the broad spectrum of functional neurological disorders (FNDs),[1] these are medical conditions in which there is a problem with the functioning of the nervous system and how the brain sends and receives signals, rather than a structural disease.[2] These disorders occupy a grey area between neurology and psychiatry and cause major challenges in terms of diagnosis and treatment,[3] as there is no gold standard diagnostic test.

Despite their common prevalence in neurological practice, patients have often been misdiagnosed, leading to inappropriate treatments, iatrogenic harm, unnecessary costly evaluations, and poor outcomes.[4]

Older ideas that FND are "all psychological" and that diagnosis is made only when someone has normal tests have changed[2] and diagnosis should be based in specific positive signs.[4,5]

Functional tics and tic-like movements are rarely reported,[3,6,7] probably because they can coexist with other FMD and because differentiation from organic tics may be difficult.[6]

Since the onset of the COVID-19 pandemic, pediatricians have noticed a marked increase in presentations of sudden and new onset of severe tics and 'tic-like' attacks.[8] There is a concern that social media such as *TikTok* application that promote the sharing of videos of influencers with symptoms may have a part to play.[8]

We report a case of an adolescent girl with sudden onset of florid vocalizations and tic like movements after prolonged watching Tourette videos on *TikTok* during lockdown.

## Case Report

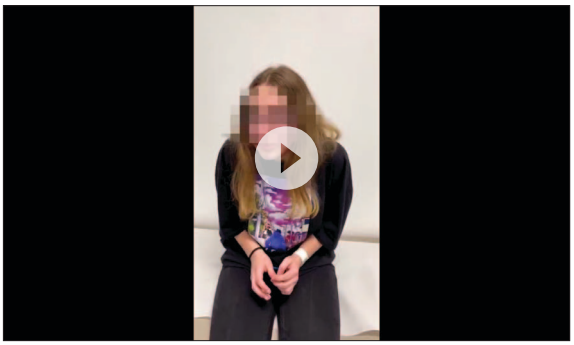
A 15-year-old female was admitted to our hospital because of sudden onset of bizarre movements and vocalizations. A history of childhood tics or neuropsychiatric disorder was absent and there was not any familiar history of tic disorders, including Tourette syndrome. She denied sleep and eating disturbances, head trauma and recent infectious diseases. Her clinical picture included eye blinking and complex movements resembling complex vocal and motor tics: head and neck tilting, repeated flexing of shoulders, arms and hands, in association with palilalia (she repeatly called out "PUDIM", which was the name of her cat, with a strange and different tone). She did not seem embarrassed with vocalizations and even demonstrated some indifference by laughing about it. No coprolalia was reported. She was not able to suppress the movements and denied premonitory urge sensations preceding the episodes. Suggestibility was observed when we asked for coprolalia or nonsense vocalizations and immediately she started imitating the voice of *Toru Oikawa*, a character from a Japanese manga series (*Haikyu*). Episodes increased with attention, improved with distraction and did not occur during sleep. She complained of throat pain because of vocalizations with a different voice that she assumed that was not hers.

Her parents described her as an anxious person and recently, with online teaching, there was a decline of school performance. The episodes started in an explosive manner in March 2021, on the day she came to us and preceded school attending in one week, as lockdown was over. She confessed that during lockdown she used social media during more than 8 hours a day, including watching Tourette syndrome videos on *Tik Tok* app most of that time.

Neurological examination by pediatric neurology was normal, aside from the movements described previously. Relevant laboratory tests, including PCR and serologies for SARS- CoV-2, electroencephalography and brain magnetic resonance imaging (MRI) were normal. She was also evaluated by psychology and pedopsychiatry and no psychiatric disorder was found.

She was diagnosed with functional tic disorder and started pshychological intervention during her admission; she was also started on alprazolam, 0.25 mg tid, due to anxiety related to her clinical condition and poor school performance. Diagnosis was carefully explained to the patient and her family. Two weeks after her discharge, she was seen at the Neurology consult, and was largely improved (symptom free for a whole week); she started alprazolam weaning and kept weekly cognitive behavioral therapy for another four months. In the first two months of cognitive behavioral therapy, using habit reversal training and exposure and response prevention, there was a recurrence of symptoms in two different moments (after intense physical effort in Physical Education class), with a brief duration. A telephone follow-up was performed three and six months after discharge. Functional tics have remitted two months after the inaugural episode, including eye blinking, upon introducing passive neuromuscular relaxation before falling asleep.

This case is illustrated by online supplementary video for which patient and parents gave written informed consent for videotaping and publishing videos.



**Video 1.** Rapid onset of tic-like behaviors and vocalizations.

## Discussion

Within the broad spectrum of movement disorders, tics, functional tic-like movements and sounds resembling tics are rare forms of psychogenic movement disorders. Both types of movements are within the range of normal and volitional movement kinematics and muscle synergies but appear repetitive and without appropriate context. The abnormality is instead at the level of control.[9] The prevalence of functional neurologic symptom disorders in children and adolescents is unknown, but it is seen in 2 to 12 per 100 000 individuals in various clinical settings.[10] Historically, there have been many attempts to separate the 2 types of movements, but because of their phenomenological overlap, clinical distinction may be prone to error and misdiagnoses may often occur. Most importantly, the 2 types of movement may coexist.[9] Baizal Carvallo and Jankovic study addressing the clinical features between patients with functional tic-like movements and Tourette syndrome (TS)[6] showed that unlike the latter, the former exhibit lack of premonitory urges and inability to suppress unwanted motor behaviors, as occurred with our patient. Other features of functional tic-like disorders included female preponderance, the presence of additional functional movement disorders, lack of response to typical anti-tic medications, and the absence of a family history of tic disorders.[6] Another study complemented this list of clinical clues with data collected from a group of 11 patients diagnosed with functional tic-like movements. In these patients, the onset was abrupt in all patients and reached their maximum severity within a few days to months from onset and were clearly distractible and suggestible during examination. The distribution of tic-like movements lacked the characteristic rostrocaudal gradient typical for tics in patients with TS. Also, organic tics have a waxing and waning course, with tics characteristics fluctuating, old repertoires being replaced by new ones and usually have a stereotyped nature.[11]

Nomenclature for functional neurologic symptom disorder has evolved over time. Conversion disorder has continued as a valid term, but the alternative term, functional neurologic symptom disorder was added in the 2013 DSM-5.[10] Diagnosis should rely on the presence of positive clinical signs, instead of a diagnosis of exclusion and there must not be a better explanation for the symptoms. Moreover, DSM-5 does not require the presence of psychologic stressors as criteria for a diagnosis.[4,12]

Our patient presentation has several characteristics that favours the diagnosis of a tic functional disorder such as abrupt onset of symptoms, subsequent rapid deterioration to maximal symptom severity, increase with attention and decrease or disappearance with distraction or when she was not being observed. She had complex bizarre movements and in general, motor primary tics are more stereotyped and less variable compared to functional jerks. Also, she did not have premonitory urge sensations preceding the episodes which are so common of organic tics and was not able to suppress them. In contrast to the late adolescent onset in our patient, typical childhood tics usually start earlier around 5-7 years old and more commonly affect boys. Vocalizations in Tourette syndrome usually occur during sentence pauses, often with imprecise pronunciation of phonemes and comprise short words, instead, our patient uttered not only compound words but also short sentences or imitated strange voices of a Japanese manga character, which favors a functional nature. The presence of echophenomena was previously documented in 1 patient with functional tic-like movements[9,13] and in a group of 13 patients, which were initially diagnosed with a primary tic disorder, however, on reevaluation by TS experts, these patients were subsequently reclassified as functional.[7,9] Although our patient laughed during observation about her movements and behaviors seeming unconcerned of her debilitating symptoms ("la belle indifference"), which also favors the functional nature of the symptoms, this classic observation is not uniformly observed.[11]

With COVID-19 lockdown, social isolation, as well as school closure and sudden shift of education to online classes, became a major source of academic stress, leading to anxiety, depression and other psychological problems.[14] Despite not being able to definitely establish a causal relationship between the psychological stressor and onset of symptoms in our patient, we believe that they are related, as she was sad about her academic performance decline. On the other hand, the role of social media and websites such as *TikTok*, that promote sharing of influencers videos with overt symptomatology, surely

played their part[8,15] since our patient watched *TikTok #tourettes* for hours before onset of symptoms.

Early recognition and treatment of functional neurological symptom disorders can result in resolution or substantial improvement in 80%–90% of childhood sufferers. A brief duration of symptoms is reported as a good prognostic factor in the majority of the studies.[1] Cognitive behavioural therapy has been the mainstay of treatment but evidence supports the importance of physical therapy.[10]

Among the different hyperkinetic movement disorders, the distinction of functional tics from organic tics can be particularly challenging because of the lack of diagnostic criteria and their clinical similarities, but they might be differentiated by particular clinical clues or positive signs.[9,11,16] Functional tics are not fully stereotypical, lack premonitory urge, interfere with speech or voluntary actions and are not voluntarily suppressed.[1,17] For some cases, a clear distinction of abnormal motor behaviors within the tic/functional tic-like movement spectrum is currently impossible. Most importantly, both types of movements may co-occur,[9] as it initially seemed to happen with our patient with co-occurrence of eye blinking movements, but these lacked the typical characteristics of tic disorder and were retrospectively considered functional. The hallmark feature of patients with functional movement disorders is the experience of abnormal movements as involuntary.[9]

The adverse impact of the COVID-19 pandemic on adult and child mental health is becoming increasingly evident. It appears that children presenting with functional symptoms, including functional tics and 'tic-like attacks', may be reflecting increases in stress-related difficulties seen in the context of the COVID-19 pandemic.[8]

This case signals the importance of adopting psychopathology prevention strategies early on during pediatric age. Considering not only functional tics but also anxiety and depressive disorders described during adolescence – a primordial phase of physical and psychological transformation and increased sensitivity to stressful life events – it is of foremost importance to implement adequate mental health programs with young people.[18] These should focus on emotional intelligence promotion, problem solving, emotional resilience and self-regulation, social skills that are seriously endangered of becoming underdeveloped due to the mostly digital current interaction and communication context, particularly during the COVID-19 pandemic confinements.[19] ■

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