

Centring Tourettic Experiences in Technology: Tourette Syndrome, Median Nerve Stimulation, and the Role of Technoableism in Self-Harm and Stigma

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Abstract

Tourette Syndrome (TS) is commonly conceptualised as a neurological disorder that frequently has childhood onset, and is characterised by tics – impulsive vocalisations or movements such as twitches, coughs, grunts or fuller and more complex words, phrases and actions. Progress in the treatment of TS and other tic disorders has recently taken a significant pivot towards the consideration of wearable technological treatments – notably wearable health technology that allows for the self-administering of median nerve stimulation (MNS) in an attempt to minimise tourettic tics and premonitory urges. The need for further research into TS, TS treatments and service provision is high. However, this commentary seeks to employ a more nuanced consideration of published findings surrounding MNS more broadly speaking, raising important ethical questions surrounding safety, self-harm, stigma and the general safeguarding of the tourettic community in community-based treatment options for TS in relation to the concept of technoableism – the focus on *cure* rather than the centring of disabled people themselves. This commentary calls for a centring on the experiences of potential tourettic users of wearable MNS technologies, rather than on the cure and compliance to expected social norms.

Keywords

Tourette syndrome, ethics, technology, technoableism, risk, harm reduction

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Introduction

Tourette syndrome (TS) is frequently conceptualised as a neurological disorder that frequently has childhood onset, and it is characterised by tics. Tics are impulsive vocalisations or movements such as twitches, coughs, grunts and so on. Most commonly known of these are coprolalia and copropraxia, which are socially inappropriate vocal tics and socially inappropriate motor tics respectively. Peer reviewed literature surrounding progress in the treatment of TS and other tic disorders (TD) has outlined interventions that include advances in approaches such as transcranial magnetic stimulation, deep brain stimulation and pharmacotherapy (Siyang et al., 2025). This review, however, specifically misses the developments in median nerve stimulation (MNS) wearable technology in

the treatment of TS. Particularly prominently in the public eye, notably within a UK context, there has been progress made through clinical trials surrounding wearable technology referred to as ‘Neupulse’ (cf. Harby & Johal, 2023) which is described as a ‘wearable wrist device that delivers median nerve stimulation at the press of a button with the aim to give people control of their tics’ (Neupulse, 2024a). MNS is understood to stimulate vagus pathways, and have impact on multiple

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areas of the brain, such as the nucleus tractus solitarius and the dorsal motor nucleus of the vagus (Hendry et al., 2025). Ultimately, it is considered a non-invasive way of using electrical currents to enable brain stimulation that clinical researchers can implement in the treatment of TS and TD.

In what many would describe as the current *bleak* landscape of disability discourse- in light of the current UK political moment of proposed disability benefit cuts (Turn2Us, 2025), more broader political weaponisation of disability on an international scale inclusive of US social security disability insurance funding cuts (Romig, 2025) and the Malaysian government's decision to reverse disability policy leading to funding cuts (Up The Flue, 2025) in combination with fearmongering and the dangerous role of non-critical engagement with TikTok and social media sites specific in the case of TS (Müller-Vahl et al., 2022, cf. response by Conelea et al., 2022) – we are in a particularly crucial moment in TS discourse specifically. As we continue to see the effects of a capitalist economy that requires non-normative bodyminds¹ to perform as the capitalist ideal of hyper-productive, efficient versions of *the human* (cf. Amoo-Adare, 2020; Lisboa & dos Santos Fernanded, 2025), it is important to bring to attention the ways in which technoableism is manifesting in relation to TS specifically.

With this in mind, this article aims to raise the case for further nuance regarding MNS-based approaches to TS treatment. As a scholar engaged in researching the lived experiences of tourettic adults, I hear frequent discussions about MNS research both within interview, focus group and visual methodologies in previous funded research projects (Jones, 2024) and otherwise within my volunteer and advocacy work.² The ways in which the use of MNS is discussed varies significantly, but what is most important is that it is assumed to be the *gold standard* of TS treatment even at this early stage where Neupulse is only available for pre-order (cf. Brazzelli & Boyers, 2024). We see this through the ways in which popular media has been engaging with the device, such as in recent film *I Swear* (Jones, 2025), which ends in a documentary-styled advertisement that praises MNS as *the* way to gain control of one's life, and by UK academics in their statements that the National Institute for Health and Care Excellence (NICE) are recommending Neupulse as an important and valuable approach that is very much needed (Institute for Mental Health, University of Nottingham, 2024).

Positive results from research into wearable MNS technology have been published previously (Iverson et al., 2023; Maiquez et al., 2023) but with the cultural context of assumed *gold standard* status of such devices already existing and with hopes for future healthcare interventions and tools being placed on MNS (cf. Abulwefa et al., 2025), there is a case to be made for more nuanced discussions and considerations of these devices that we have a moral responsibility to write and inquire about. The medical

commitment to 'universal truth' has given way to assumptions that *gold standards* and the *one best* approach exist when it comes to disability. Whilst fixed procedures and policies in medicine have their place in protecting against medical negligence and aim to benefit the patients in question, in the instance of MNS for this commentary I argue that they can be damaging because of the lack of critical engagement that currently exists surrounding MNS for TS treatment. It has been stated that 'Gold standards, whether actual or figurative, represent structures of exchange and aspirations toward stability' (Jones & Podolsky, 2015, p. 1503). However, disability and disabled experiences are objectively *not* static, and so are *not* stable. The embodied experiences of TS specifically in this regard are complex, intersectional, and ever-evolving and so the assumption of *gold standard* when it comes to the use of MNS needs critiquing and engaging with in greater depth, particularly from a technoableism perspective. The argument surrounding technoableism is that technologies developed with intention to *cure* or *fix* disability are rooted in ableist rhetorics, and whilst the able-bodied designers behind these technologies 'usually think they have the good of disabled people in mind [they] do not see how their work reinscribes ableist tropes and ideas on disabled bodies and minds' (Shew, 2020, p. 43). This article aims to raise these questions, and provide a starting point for more nuanced discussion of MNS technology for *managing* TS.

Researcher Interdisciplinary Background and Context

With a commentary such as this, it is key to be transparent about the ways in which author positionality influences what is to come. In this section, I outline my lived experiences in detail to highlight my own positionality and research background(s) in order to articulate my authority as a researcher. As a researcher, I am positioned within critical disability studies and critical medical humanities. Critical disability studies can be described as an approach to disability that understands it as a political, historical and cultural experience, using intersectional approaches to researching disability. It is concerned with disability politics, disability justice, and the ways in which they entangle with disability research (Goodley et al., 2017). Additionally, critical medical humanities specifically holds interest in close engagement with critical theory, disability justice and activism, to name a few, in the research of health and its relevance to society (cf. Viney et al., 2015). More specifically, my current research is situated within what I refer to as critical tourettic research. By this, I mean to say that similarly to critical disability studies (Goodley et al., 2021; Shildrick, 2019) and the critical medical humanities (Viney et al., 2015), I am particularly interested in the political, historical and cultural experience of TS, in

line with a disability justice approach to research. Within this falls a key focus on *community*, whether imagined, online and social media-housed, or found in support groups (cf. Cochrane, 2017). Of particular importance in my critical tourettic studies approach is the focus on community and solidarity. MNS has been referred to as enabling ‘community treatment’ options (Iverson et al., 2023), meaning that it is a treatment that is administered in the community, beyond the clinic. With MNS positioned as allowing the potential for community treatment options through wearable health technology, there are important ethical discussions that seem to be missing in existing published literature surrounding the wellbeing of the tourettic community as a whole.

It is also useful to acknowledge here my positionality as tourettic researcher of TS. Having been diagnosed with TS myself, I am deeply ingrained in the everyday politics of TS discourse (cf. Jones & Phoenix-Kane, 2025). The effects of papers, trials and commentaries are things that I feel and experience deeply; they are things which have a direct impact on my life, and so I write here from a place of simultaneous academic expertise and lived experience. My own simultaneous experience as TS researcher and lived experiences of TS mean that I am perhaps in a unique position to comment in a particularly nuanced way that I believe hasn’t been done yet through peer-reviewed publication in the case of MNS wearable technology specifically for TS. With this in mind, the implications of what this commentary discusses are things that will have direct consequences or impacts on my own lifecourse as a tourettic person, and so my positionality in this regard underwrites what is to follow.

A Background for Median Nerve Stimulation: Stigma and Self-Injurious Behaviour in Tourette Syndrome

Stigma has a significant role on the overall mental health and wellbeing of tourettic people. These concerns have been used as justifications for the need of wearable MNS technology, but unfortunately there is a current lack of nuanced consideration of the secondary impact of this approach to the treatment of TS. This section shall outline some key literature surrounding stigma, mental health and TS as a means of giving context to the discussions in this commentary moving forwards.

Stigma is a particularly well-researched issue in the instance of TS, particularly in the context of social stigma, self-stigma, and *courtesy* stigma in non-tourettic stakeholders of TS such as the parents of tourettic children (cf. Malli et al., 2016). Not only has stigma been explored in the context of health and medical sciences on the difference between enacted, anticipated and internalised stigma (Pring et al., 2025; Shiu et al., 2023), but also in other disciplines.

This includes within the social sciences, providing context for the social stigma and humour associated with TS. Social science approaches have considered the stigmatised experiences of tourettic people in different social spaces, such as the workplace or when using public transport, in relation to the discrimination they encounter (Malli & Forrester-Jones, 2022). Additionally, this also includes a philosophy and bioethics perspective in thinking through stigma, blame, and tourettic behaviours and how stigma can be experienced in biomedical settings (Bervoets et al., 2021). In fact, the literature on stigma was a fundamental part of paving the way for wearable MNS technology to be developed. In particular, research on the impact of life-long endured stigma highlights the risks of repeated stigmatisation, referring to stigma as traumatic (Pring et al., 2025; Stalzer, 2025). It is well known that mental trauma has a significant impact on health and wellbeing (Magruder et al., 2017), and so it can be argued that the same goes for stigmatisation in TS.

Recently, Malli and Forrester-Jones (2025) published an incredibly important monograph entitled ‘Tourette’s Syndrome, Stigma, and Society’s Jests’. The monograph outlines some of the specific nuances of tourettic stigmatisation by society and highlights that the social problem of stigmatisation of TS and tourettic people is something that needs addressing. This, along with the plethora of recently published literature highlights the ways in which the stigmatisation of TS and tourettic people is at the forefront of TS scholarship as of current (Cox et al., 2019; Pring et al., 2025; Shiu et al., 2023). Notably, Malli and Forrester-Jones (2025) discuss the management of TS-related stigma, drawing contrasts and similarities between the case of TS and of disability movements more broadly speaking. They refer to the role of parent advocacy, and discuss the experiences of non-tourettic parents of tourettic children in relation to managing this stigma through advocacy, awareness-raising, and through caregiving. One way of managing this stigma that the authors refer to is through concealing, hiding and adapting to pass as non-tourettic – the book highlights research participant examples of ‘controlling’ or ‘hiding’ tics, and of suppressing tics. Suppressing tics can be particularly tiring and can even worsen the severity of tics later on, and it can require a significant period of resting to recover from the fatigue of prolonged periods of tic suppression. Malli & Forrester-Jones explain how a lot of stigma comes from attempts to ‘[a]ssimilate to the [n]orm’ (p. 366). Expectations and pressures associated with *fitting in* with assumed normative bodyminds are significant in contributing to stigmatisation and self-stigmatisation of disabled, neurodivergent and chronically ill people more broadly speaking (cf. Grand’Maison & Soldatic, 2024; McLaughlin, 2017), but there are some distinctions in the case of TS and the development of wearable MNS technology that come to surface when we consider power and dynamics, which will be explored later in the commentary.

Particularly linked with arguments and scholarly developments surrounding TS and stigma, within TS research there has been frequent consideration in recent years surrounding self-injurious behaviour (SIB) and TS, inclusive of intentional self-harm. Baizabal-Carvalho et al. (2022) highlight some specific instances of secondary scars arising from scratching and hitting tics, concluding that SIB is present in around 17% of patients, with reflexive self-damage being the most present form of SIB. Mathews et al. (2004) draw links between the inherent impulsivity associated with TS and the engagement in SIB, suggesting that impulse dysregulation might be more common in tics. This pain, whatever the cause might be, can have a detrimental effect long term. Living with chronic pain is significantly linked to poorer mental health outcomes (Outcalt et al., 2015) and this is important to acknowledge in the context of TS also.

Rates of depression amongst the tics community are higher than their non-disabled counterparts (Robertson, 2006). Additionally, the risk of self-harm and suicide is also heightened amongst tics populations (de la Cruz et al., 2017). These are reasons given by Maiquez et al. (2023) as justifications for the need for exploring treatment options relating to TS and TDs that implement MNS. MNS researchers rightfully highlight the concerning limited access to support and treatments for TS, and, again, rightfully justify the need for clinical trials for wearable MNS technology. The work on stigmatisation also comes into play here, showing that wearable MNS technology been created out of response to a specific need within the tics community. Experiences of stigma specific to TS are significant, and intervention is needed. However, these very statistics and research findings that are used to justify the need for further exploring of treatment options may also open up the opportunity for further critical engagements with the approach of MNS more broadly speaking. In doing so, questions arise surrounding the potential negative impact on stigma and mental health in TS discourse that wearable MNS technologies themselves might unintentionally reinforce. This commentary produces conversations surrounding MNS and technoableism that encourage and invites us as researchers to more critically engage with the contexts not only from which wearable MNS technology have been conceived, but also the contexts in which it might be (mis)used.

Median Nerve Stimulation and Risk: A Call for Further Critical and Nuanced Engagement

It is important to acknowledge that there are plenty of risks associated with the use of wearable MNS technology for TS, none of which at the time of writing have been explored in peer-reviewed literature. This section of the commentary

shall offer some brief examples of the ways in which tics people experience technoableism, before moving on to offer four key areas of critique. Firstly, it shall consider the role of pain and ND variations in pain expression. It shall then query the involvement of the tics community and the extent to which this was the case, before considering specific contributions that MNS might result in relating to the technoableist stigmatisation of TS. Finally, it shall bring in intersectional considerations of MNS and TS, before asking what the next steps should be for this research given the context of its contributions towards increasing technoableist stigmatisation.

It is no groundbreaking statement that tics can cause pain, and this is a key part of the justification and value of the exploration of wearable MNS technology. The research has been considered promising, with a 35 percentile reduction and further reductions in tic frequency associated with the active clinical trial. Specifically, this equates to a 7.1 points reduction in Yale Global Tic Severity Scale in contrast to a 2.13/2.11 reduction for the sham stimulation and waitlist control groups. This is generally considered a significant reduction.³ Despite data that might imply promising results, it is important to acknowledge that this technology has been concluded by researchers as suitable for use with children and young people (Maiquez et al., 2023). Promotional material for such devices positions them as a safe treatment option, even for young children. However, it is important here to remind ourselves of ideas surrounding *technoableism* coined by Ashley Shew. Once more, this outlines the ways in which technologies developed with intention to *cure* disability and its symptoms (inclusive of tics) are rooted in ableist rhetorics, and favour compliance with perceived social normality over the actual experiences had by the disabled technology users. Examples of the ways in which tics people may experience technoableism include the ‘OMBRA Soundproof Mask’ that resembles a muzzle and that is designed to lower the volume of tics (Metadox, 2025); the non-consensual muting of a tics person’s microphone in videoconferencing settings for school or work such as Zoom, Microsoft Teams or Google Meet to ‘minimise’ disruption of tics; or also in the specific programming of automatic captioning features on social media sites such as Instagram that automatically *bleep* out any swear words, inclusive of coprolalic tics (O’Dell, 2021). In specific reference to technoableism and MNS for TS, there is a need for significantly more nuanced engagement and critique, particularly in line with anti-technoableist calls for a shift in the focus away from cure and onto the consideration of the disabled technology user themselves. Whilst intentions are usually not malicious, ‘most experts about disabled people are non-disabled people [...] So most of our [representations of disabled people] do a disservice to actual technologized disabled people’ (Earle & Shew, 2024, p. 4). There are many possible implications of

technologising tourettic people through the use of wearable MNS technology, surrounding wellbeing and stigma in particular, and at the time of writing these critical engagements with the technoableist risks associated with MNS devices have not been published or made publicly available.

Researchers themselves note that MNS can be painful at high stimulation intensities, hence some researchers taking preventative measures to minimise pain when calibrating the device for young children (Maiquez et al., 2023). However, it is important to acknowledge also that pain threshold significantly varies between individuals. Furthermore, pain thresholds and the way that people experience pain can be particularly different amongst neurodivergent (ND) populations. For example, Failla et al. (2020) outline how autistic people often experience increased pain sensitivity – plenty of published work exists in this regard. Considering the prominence of comorbid neurodivergent conditions, including autism, amongst patients with TS (Groth et al., 2017), it is also important here to acknowledge that some types of stimulation or pain may be experienced more intensely than others depending on the person. Ultimately, MNS may even be painful for some at lower intensities that we may assume to be painless due to neurodivergent differences in pain expression (cf. Kerekes et al., 2021; Whitney & Shapiro, 2019). In the case of MNS, researchers write of how a visible thumb twitch might be used to determine or calibrate the required intensity of the *stimulation* from wearable MNS technology (Houlgreave et al., 2022). With pain thresholds in question here, along with research that shows the expression of experiencing pain can also differ significantly amongst ND populations (Csecs et al., 2022), it is important to think back to the very work that justified the exploration of the value of wearable MNS technology in the first instance. In other areas of research, there has been work highlighting the importance of pain assessment scales for those who may not be able to communicate their pain levels, which gave way to the PAIC15 scale (Corbett et al., 2014). With ND variations in communication styles in mind, along with the significance of comorbid neurodivergent conditions with TS, whilst the PAIC15 was developed with dementia in mind, perhaps we need to think about the perceptions and assessment of pain with greater depth when it comes to TS. How is pain being assessed in the case of the MNS devices, both in device calibration and during daily use? Once more, the risk of self-harm and suicide is higher for tourettic populations. What risks that arise from the use of wearable MNS technology might be further reduced through a more nuanced consideration, particularly surrounding pain and self-harm (cf. van Hoorn, 2020)? It is here in the prioritisation of an absence of (or at least a reduction in) tics over concerns about experiences of pain that can be caused by technology that aligns this critique with technoableism – it is the lack of consideration of implications or consequences here, whether related to increase in pain or

even in SIB that renders this a technoableism-aligned concern (cf. Bell, 2025).

Within TS research, there has been concerning interrogation of young people who tic in response to stigmatised concerns over the supposed *spreading* of TS and tics via social media contagion – this is particularly targeted towards the social media platforms YouTube and TikTok (Muller-Vahl et al., 2022). If we consider current research surrounding ‘stop that’ sentiments and their stigmatising impacts on tourettic people (Conelea et al., 2022), amongst other stigmatising representations of TS and TDs found in popular media (cf. Jones, 2022), we can come to conclude that increased SIB, self-harm, and suicidality is at least in part related to the social stigma of TS, whether pushed by academics, clinicians, or media outlets. With the context of stigma and SIB in mind, I call for more critical engagement with MNS technologies, or at least a more open and publicly available sharing of risk-based and ethical considerations that have been taken in this regard. Given that such MNS devices have been referred to as a ‘community-based treatment device’, there needs to be further opportunity to involve the tourettic community. It is key to note is that promotional material for such devices state that ‘[t]he direction [of] our current research was very much shaped by the feedback we received from individuals with tic disorders and their families’ (Neupulse, 2024b). At first glance, this sounds promising. But what for the consultation ratio of people diagnosed with TS in comparison to non-tourettic stakeholders in TS, such as parents of tourettic children? What are the implications of using non-tourettic people in the activities being said to be linked with the ‘community’ aspect of the project? To what extent can we really say that the community were/are involved? Speaking broadly of MNS here, we cannot make these judgements without publicising these statistics and demographic details, and without knowing whether tourettic people are being centred as the most effected by TS in line with a person-centred approach to disability (cf. Bervoets et al., 2023; Jones & Gauthier-Mamaril, 2024).

Additionally, it is useful to draw anecdotally here as a member of the tourettic community myself. Within my own tourettic circles, there is concern over the validity of MNS, along with questions surrounding the calibration process and how much pain is expected to be tolerated during the calibration of the device. In my work as a TS advocate and community facilitator aside from my scholarly employment, I have supported tourettic adults in their registering for MNS clinical trials and offered support when they shared the intense pain that they went through to get MNS devices fitted, some of whom were told they were ineligible for the trial because they could not tolerate the pain that was involved in fitting and calibrating the device. Some seem to have experienced no pain, some have experienced significant pain. Once more, this highlights the incredibly varied experiences

of pain-related expression and experiences within the tourettic community, and speaks to the diversity of experiences surrounding pain within the neurodivergent community more broadly speaking. Additionally, conversations have arisen within research communities (researchers of whom have requested to be kept anonymous for the sake of this article) surrounding what is being dysregulated in the process of stimulating the median nerve to reduce tics. There is a clear concern here over the lack of consideration of consequences that renders this a technoableist approach.

With this in mind it is vital to consider and discuss the potential risks of wearable MNS technology. In our rightful frustration over the lack of guidelines for evidence-based healthcare processes such as UK NICE guidelines for TS, and the less-than-adequate treatment options for TS that currently exist and that are publicly available, have we been too quick to accept and acknowledge *only* the positive possibilities of MNS? The work of research teams such as those behind Neupulse have provided an incredibly important step forwards in understanding TS and moving towards more hopeful futures of TS treatment that seeks to improve the quality of life of tourettic people. However, there are also significant risks to acknowledge when it comes to MNS broadly speaking. I would like to see more discussion and critical engagement with research findings, implications and possibilities of using MNS to reduce tic frequency and severity. What for the increased risk of stigma? Has a consideration been made of what general public expectations about the success of this wearable MNS technology might be and the implications of this on tourettic people occurred? If a device is assumed to be able to minimise tics, how might this open up the opportunity for increased stigmatisation, such as teachers being frustrated with disruptions to their classes demanding that the patient (child) uses the device more, or even in parents feeling second-hand embarrassment over tics in busy places and pressuring increased use of the device. With devices such as Neupulse having recently been made available for pre-order at the high cost of £500, with an additional £20 per month subscription, we must also ask how this high price point might also further contribute to the technoableist stigmatisation of TS. For example, Neupulse only offers a full refund for the pre-order of the device if you request a refund prior to the device being delivered (Neupulse, 2025). What for parents who, in their desperation to improve the quality of life for their children, spend a large amount of money on the device for it to be too painful or simply just not have an effect on the tourettic child in question? Perhaps it is a possibility that parents and carers who have paid for this device will insist that their tourettic children use it regardless of the child's wishes due to the significant financial investment? The tourettic bodymind is known to be subject to incredible amounts of stigmatisation (Malli & Forrester-Jones, 2022), and this is a part of the technoableism inherent to wearable MNS

technologies – what are the risks of implementing this wearable technology relating to the way tourettic people are expected to interact with these technologies and with the spaces that they occupy. Additionally to this, what for the increase of stigma even more so for multiply marginalised tourettic people?

For example, thinking intersectionally in this regard, we know that self-harm rates increase for multiply marginalised populations in multiply disabled people, LGBTQ+ populations (Gnan et al., 2019) and global majority ethnic populations (Knipe et al., 2024), amongst others. With this in mind, we must acknowledge that TS research is particularly white. We see research highlighting the specific underrepresentation of global majority ethnic groups in published work (Dy-Hollins et al., 2023), along with acknowledgements of lack of diversity in ethnicity of participants seemingly across the board (cf. Cutler et al., 2009). This is not out of lack of awareness on the part of the researchers, but likely the lack of spaces that exist for multiply minoritised tourettic people (cf. Jones, 2024). With this in mind, and a significant lack of diversity present in TS research, perhaps it would be useful to see a much more open discussion about the demographics of the community being included in MNS research for TS. How representative of the community are these projects, and what actionable steps to achieve a representative patient group would be useful to know in allowing those situated outside of the projects to make critically informed decisions (cf. Kelsey et al., 2022)? The preferences in research directions will significantly differ between folks of differing marginalised identities. Ultimately this is to say that we need to not only centre the people who have lived experience of TS when thinking about risk, but also those with intersecting marginalised identities. There are risks of the ways in which this treatment option appears to focus on compliance with socially constructed 'norms' as opposed to the users' everyday experiences and wellbeing. Some limited conversations are beginning to emerge surrounding moving beyond technoableism and thinking about the benefits of the *techno* within disability more generally, such as thinking through the idea of *technoENABLEISM* (Scherer, 2024), though these are still rooted in hyper-productive capitalist ideals of 'enhanc[ing ...] functioning' of disabled people (p525). Whilst I by no means am stating that all medical and health-related technology is inherently bad or ableist, there are particular risks in the case of wearable MNS technology that arise through considering technoableist critiques. It is crucial to not only question *what* kinds of risks are being prioritised, but also *whose* risks are being made visible and actionable. To move forward ethically, TS research and innovation must create genuinely inclusive spaces where multiply-minoritised voices can inform both the questions asked and the technologies developed. Without this, the promise of novel interventions such as the use of wearable MNS technology have a risk of becoming simply another iteration of so-called progress that ultimately is reinforcing

exclusion and technoableism-enabled (or even encouraged) stigmatisation.


Conclusions and Next Steps

Have we been too quick to assign wearable MNS technology a *gold standard* reputation? Recently, the NICE guidelines early value assessment for digital therapies for TS stated that ‘there was limited evidence particularly for Neupulse’ (NICE, 2025), an example of wearable MNS technology. Current leading research into wearable MNS technology for TS is led specifically by a health tech start-up, driven by speed and profit with entrepreneurship at their heart (Neto, 2020) – something which is of notable difference from the approach of much clinical research. Acknowledging the business-centric approaches to MNS research for TS is important, as we see research promotion on a variety of platforms and scales, including but not limited to the sponsoring of international TS conferences such as the European Society for the Study of Tourette Syndrome (ESSTS, 2022) and the inclusion of celebrities such as Lewis Capaldi (a Scottish singer-songwriter who has publicly shared his experiences with TS) by inviting him to trial MNS devices (Neupulse, 2023). This marketing has been particularly impressive, and has brought a lot of well-received awareness to progress in TS research, but it’s important to consider this with nuance when it comes to *why* we are considering wearable MNS technology to be the *gold standard* in TS treatment when it poses many potential risks that those involved in writing in and around TS research and discourse seem hesitant to acknowledge. This is particularly regarding conversations around technoableism and the ways in which unintentionally technoableist approaches may lead to increased stigmatisation in everyday settings of touretic people. Before assigning this status, we must encourage further nuanced discussion and critique of wearable MNS technology for TS. The progress of research into wearable MNS technology might be seen as promising, and has offered much in the way of understanding the way that TS works. I acknowledge that health technologies are not inherently good or bad (cf. Powell et al., 2025). However, this commentary illustrates the need to critically interrogate how scientific innovation, societal ideas of ‘normality’ and touretic stigma intertwine in shaping which technologies are positioned as legitimate treatments more broadly speaking.

If we are to really have the community as the heart in so-called ‘community treatment options’ within the context of an arguably increasingly ableist society, perhaps we should consider anti-technoableist approaches in focusing on the disabled person themselves, and more specifically centring touretic experiences within technology research and practice in healthcare settings. Through outlining the ways in which touretic people experience technoableism and clarifying the technoableist potentials of the use of

wearable MNS technology, this commentary has ushered us towards greater levels of critical engagement surrounding MNS and TS, calling for a person-centered and anti-technoableist approach. Practically, this anti-technoableist approach might look like taking an intentional shift away from trying to use MNS, transcranial magnetic stimulation, and brain stimulation (to name just a few) as a means of changing touretic bodyminds into a version of the body that is associated with societal normality. Anti-technoableist approaches would look to not eradicate TS, but rather look positive *touretic futures* with the intention of removing stigmatisation rather than removing the existence that is stigmatised. We need to consider the implications of technologising touretic people through the implementation of wearable MNS technology with significantly more nuance moving forwards, ensuring that we centre touretic voices in conversations surrounding TS and technology.

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Notes

1. I use ‘bodymind’ in line with Price’s approach, highlighting concern with the body-and-mind binary, highlighting the interconnected nature of body and mind – *bodymind* (cf. Price, 2015).
2. I wish to here explain that this has not come through official collection in its entirety, but rather my own engagement and involvement and collaboration with the Tourette syndrome community, and the relationships that I have built as somebody diagnosed with Tourette syndrome myself. Names have been consensually redacted here due to concerns of ‘burning bridges of collaboration’ between those who these conversations were had with, and those who largely promote and talk highly of the wearable MNS technology.
3. The Yale Global Tic Severity Scale ranges from 0-50, and so a 7.1 point reduction equates to roughly 14% of the maximum possible score.

References

- Abulwefa, A., Twati, W., & Kurdi, S. (2025). Context and management strategies for the dental care of Tourette’s children.

- Khalij-Libya Journal: Dental and Medical Research*, 9(2), 185–196. <https://doi.org/10.47705/kjdmr.259207>
- Amoo-Adare, E. A. (2020). The art of (un)thinking: When hyper productivity says ‘enough!’, is a feast. *Postdigital Science and Education*, 2(3), 606–613. <https://doi.org/10.1007/s42438-020-00162-z>
- Baizabal-Carvalho, J. F., Alonso-Juarez, M., & Jankovic, J. (2022). Self-injurious behavior in Tourette Syndrome. *Journal of Neurology*, 5(2022), 1–7. <https://doi.org/10.1007/s00415-021-10822-0>
- Bell, J. (2025). Depression and pragmatism. *William James Studies*, 20(1), 20–38. <https://www.jstor.org/stable/48822692>
- Bervoets, J., Beljaars, D., & De Jaegher, H. (2023). Letting Tourette’s be: The importance of understanding lived experience in research and the clinic. *Developmental Medicine & Child Neurology*, 65(11), 1422–1428. <https://doi.org/10.1111/dmcn.15545>
- Bervoets, J., Kampen, J. K., & Hens, K. (2021). Exculpation and stigma in Tourette Syndrome: An experimental philosophy study. *Neuroethics*, 15(1), 2. <https://doi.org/10.1007/s12152-022-09486-y>
- Brazzelli, M., & Boyers, D. (2024). Digitally enabled therapy for chronic tic disorders and Tourette syndrome in children and young people. *NIHR Grant, University of Aberdeen*. <https://www.fundingawards.nihr.ac.uk/award/NIHR136022>
- Cochrane, L. E. (2017). An imagined community of practice: Online discourse among wheelchair users. *Linguistik Online*, 87(8), 151–166. <https://doi.org/10.13092/lo.87.4177>
- Conelea, C. A., Bervoets, J., Bethan Davies, E., Varner, K., Malli, M., Jones, D. P., Beljaars, D., & Capriotti, M. R. (2022). A call for caution: ‘stop that’ sentiments threaten tic research, healthcare and advocacy. *Brain*, 145(4), e18–e20. <https://doi.org/10.1093/brain/awac028>
- Corbett, A., Achterberg, W., Husebo, B., Lobbezoo, F., de Vet, H., Kunz, M., Strand, L., Constantinou, M., Tudose, C., Kappesser, J., & Lautenbacher, S. (2014). An international road map to improve pain assessment in people with impaired cognition: The development of the Pain Assessment in Impaired Cognition (PAIC) meta-tool. *BMC Neurology*, 14, 1–14. <https://doi.org/10.1186/s12883-014-0229-5>
- Cox, J. H., Nahar, A., Termine, C., Agosti, M., Balottin, U., Seri, S., & Cavanna, A. E. (2019). Social stigma and self-perception in adolescents with Tourette syndrome. *Adolescent Health, Medicine and Therapeutics*, 10, 75–82. <https://doi.org/10.2147/AHMT.S175765>
- Csecs, J. L., Iodice, V., Rae, C. L., Brooke, A., Simmons, R., Quadt, L., Savage, G. K., Dowell, N. G., Prowes, F., Themelis, K., Mathias, C. J., Critchley, H. D., & Eccles, J. A. (2022). Joint hypermobility links neurodivergence to dysautonomia and pain. *Frontiers in Psychiatry*, 12, 786916. <https://doi.org/10.3389/fpsy.2021.786916>
- Cutler, D., Murphy, T., Gilmour, J., & Heyman, I. (2009). The quality of life of young people with Tourette syndrome. *Child: Care, Health and Development*, 35(4), 496–504. <https://doi.org/10.1111/j.1365-2214.2009.00983.x>
- de la Cruz, L. F., Rydell, M., Runeson, B., Brander, G., Rück, C., D’Onofrio, B. M., Larsson, H., Lichtenstein, P., & Mataix-Cols, D. (2017). Suicide in Tourette’s and chronic tic disorders. *Biological Psychiatry*, 82(2), 111–118.
- Dy-Hollins, M., Chibnik, L., Realbuto, E., Rao, V., Sharma, N., Park, E., Mathews, C., & Scharf, J. (2023). Black and Hispanic individuals with Tourette syndrome are underrepresented in specialty clinics. *Neurology*, 100(17), 1945. <https://doi.org/10.1212/WNL.000000000000202214>
- Earle, J., & Shew, A. (2024). Cyborg-technology relations. *Journal of Human-Technology Relations*, 2(1), 1–19. <https://doi.org/10.59490/jhtr.2024.2.7073>
- ESSTS. (2022). Brussels, Belgium: 15th European Conference on Tourette Syndrome & Tic Disorders. <https://www.essts.org/meetings/brussels>
- Failla, M. D., Gerdes, M. B., Williams, Z. J., Moore, D. J., & Cascio, C. J. (2020). Increased pain sensitivity and pain-related anxiety in individuals with autism. *Pain Reports*, 5(6), e861. <https://doi.org/10.1097/PR9.0000000000000861>
- Gnan, G. H., Rahman, Q., Ussher, G., Baker, D., West, E., & Rimes, K. A. (2019). General and LGBTQ-specific factors associated with mental health and suicide risk among LGBTQ students. *Journal of Youth Studies*, 22(10), 1393–1408. <https://doi.org/10.1080/13676261.2019.1581361>
- Goodley, D., Lawthom, R., Liddiard, K., & Runswick-Cole, K. (2017). Critical disability studies. In B. Gough (Ed.), *The Palgrave handbook of critical social psychology* (pp. 491–505). Palgrave Macmillan.
- Goodley, D., Lawthom, R., Liddiard, K., & Runswick-Cole, K. (2021). Key concerns for critical disability studies. *The International Journal of Disability and Social Justice*, 1(1), 27–49. <https://doi.org/10.13169/intljofdissojus.1.1.0027>
- Grand’Maison, V., & Soldatic, K. (2024). Stigma as a structure of disablement: Towards collective postcolonial justice. In R. A. Abay & K. Soldatic (Eds.), *Intersectional colonialities* (pp. 137–155). Routledge.
- Groth, C., Debes, N. M., Rask, C. U., Lange, T., & Skov, L. (2017). Course of Tourette syndrome and comorbidities in a large prospective clinical study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 56(4), 304–312. <https://doi.org/10.1016/j.jaac.2017.01.010>
- Harby, J., & Johal, N. (2023). Tourette’s device tested by Lewis Capaldi reduces tics in trial. *BBC News*. Accessed November 10, 2025, from <https://www.bbc.co.uk/news/uk-england-nottinghamshire-64917852>
- Hendry, E. T., Gonzales Balfe, J., Du, P., & Cakmak, Y. O. (2025). Frequency-specific effects of noninvasive median nerve stimulation on gastric slow wave activity in humans. *Neuromodulation: Technology at the Neural Interface*, 28(5), 775–786. <https://doi.org/10.1016/j.neurom.2023.12.005>
- Houlgreave, M. S., Maiquez, B. M., Brookes, M. J., & Jackson, S. R. (2022). The oscillatory effects of rhythmic median nerve stimulation. *NeuroImage*, 251, 118990. <https://doi.org/10.1016/j.neuroimage.2022.118990>

- Institute for Mental Health, University of Nottingham. (2024). Technology developed in Nottingham to treat Tourette's recommended by NICE. *News*. Accessed November 10, 2025, from https://institutemh.org.uk/news/news/1886-technology-developed-in-nottingham-to-treat-tourettes-recommended-by-nice?utm_source=chatgpt.com
- Iverson, A. M., Arbuckle, A. L., Ueda, K., Song, D. Y., Bihun, E. C., Koller, J. M., Wallendorf, M., & Black, K. J. (2023). Median nerve stimulation for treatment of tics: Randomized, controlled, crossover trial. *Journal of Clinical Medicine*, *12*(7), 2514. <https://doi.org/10.3390/jcm12072514>
- Jones, D. P. (2022). A call for solidarity-focused programming: Channel 4's Disability Code and the Representation of Tourette Syndrome in *Britain's Tourette's Mystery - Scarlett Moffatt Investigates*. Accessed February 21, 2025, from <https://learningonscreen.ac.uk/viewfinder/articles/a-call-for-solidarity-focused-programming/>
- Jones, D. P. (2024). *Geographies of impulse: Tourette syndrome and the Embodied Experience(s) of Public Space* [PhD thesis]. Newcastle University, [Under embargo].
- Jones, D. P., & Gauthier-Mamaril, É. (2024). Missive from the accommodations loop. *iHuman, University of Sheffield*. <https://www.sheffield.ac.uk/ihuman/waarc/missive-accommodations-loop>
- Jones, D. P., & Phoenix-Kane, D. (2025). Tourettic research of Tourette syndrome: Some reflections. *Neurodiversity*, *3*(2025), 1–7. <https://doi.org/10.1177/27546330251328489>
- Jones, D. S., & Podolsky, S. H. (2015). The history and fate of the gold standard. *The Lancet*, *385*(9977), 1502–1503. [https://doi.org/10.1016/S0140-6736\(15\)60742-5](https://doi.org/10.1016/S0140-6736(15)60742-5)
- Jones, K. (Director). (2025). *I Swear* [Film]. StudioCanal.
- Kelsey, M. D., Patrick-Lake, B., Abdulai, R., Broedl, U. C., Brown, A., Cohn, E., Curtis, L. H., Komelasky, C., Mbagwu, M., Mensah, G. A., Mentz, R. J., Nyaku, A., Omokaro, S. O., Sowards, J., Whitlock, K., Zhang, X., & Bloomfield, G. S. (2022). Inclusion and diversity in clinical trials: Actionable steps to drive lasting change. *Contemporary Clinical Trials*, *116*, 106740. <https://doi.org/10.1016/j.cct.2022.106740>
- Kerekes, N., Sánchez-Pérez, A. M., & Landry, M. (2021). Neuroinflammation as a possible link between attention-deficit/hyperactivity disorder (ADHD) and pain. *Medical Hypotheses*, *157*, 110717. <https://doi.org/10.1016/j.mehy.2021.110717>
- Knipe, D., Moran, P., Howe, L. D., Karlsen, S., Kapur, N., Revie, L., & John, A. (2024). Ethnicity and suicide in England and Wales: A national linked cohort study. *The Lancet Psychiatry*, *11*(8), 611–619. [https://doi.org/10.1016/S2215-0366\(24\)00184-6](https://doi.org/10.1016/S2215-0366(24)00184-6)
- Lisboa, A. M., & dos Santos Fernanded, E. A. (2025). “You have the same 24 hours like a billionaire”: Neuroproductivity as a device of biopower. *Fórum Linguístico*, *22*, 1–11. <https://doi.org/10.5007/1984-8412.2025.e105508>
- Magruder, K. M., McLaughlin, K. A., & Elmore Borbon, D. L. (2017). Trauma is a public health issue. *European Journal of Psychotraumatology*, *8*(1), 1375338. <https://doi.org/10.1080/20008198.2017.1375338>
- Maiquez, B. M., Smith, C., Dyke, K., Chou, C. P., Kasbia, B., McCready, C., Wright, H., Jackson, J. K., Farr, I., Badinger, E., Jackson, G., & Jackson, S. R. (2023). A double-blind, sham-controlled, trial of home-administered rhythmic 10-Hz median nerve stimulation for the reduction of tics, and suppression of the urge-to-tic, in individuals with Tourette syndrome and chronic tic disorder. *Journal of Neuropsychology*, *17*(3), 540–563. <https://doi.org/10.1111/jnp.12313>
- Malli, M. A., & Forrester-Jones, R. (2022). Stigma and adults with Tourette's syndrome: “Never laugh at other people's disabilities, unless they have Tourette's—because how can you not?”. *Journal of Developmental and Physical Disabilities*, *34*(5), 871–889. <https://doi.org/10.1007/s10882-021-09829-2>
- Malli, M. A., & Forrester-Jones, R. (2025). *Tourette's syndrome, stigma, and society's jests*. Palgrave Macmillan.
- Malli, M. A., Forrester-Jones, R., & Murphy, G. (2016). Stigma in youth with Tourette's syndrome: A systematic review and synthesis. *European Child and Adolescent Psychiatry*, *25*(2), 127–139. <https://doi.org/10.1007/s00787-015-0761-x>
- Mathews, C. A., Waller, J., Glidden, D., Lowe, T. L., Herrera, L. D., Budman, C. L., Erenberg, G., Naarden, A., Bruun, R. D., Freimer, N. B., & Reus, V. I. (2004). Self injurious behaviour in Tourette syndrome: Correlates with impulsivity and impulse control. *Journal of Neurology, Neurosurgery & Psychiatry*, *75*(8), 1149–1155. <https://doi.org/10.1136/jnnp.2003.020693>
- McLaughlin, J. (2017). The medical reshaping of disabled bodies as a response to stigma and a route to normality. *Medical Humanities*, *43*, 244–250. <https://doi.org/10.1136/medhum-2016-011065>
- Metadox. (2025). The OMBRA soundproof mask: Lower the volume – you're your voice. *Metadox*. Accessed November 11, 2025, from https://metadox.pro/pages/tourette?srsltid=AfmBOoqIJKy42yj-J009t_n6HGbqrlhOef45ZNVpouDKXE_mYKDtBxhf
- Müller-Vahl, K. R., Pisarenko, A., Jakubovski, E., & Fremer, C. (2022). Stop that! It's not Tourette's but a new type of mass sociogenic illness. *Brain*, *145*(2), 476–480. <https://doi.org/10.1093/brain/awab316>
- Neto, I. (2020). Health tech entrepreneurs must be patient – autopsy of a failed Nigerian health tech startup. *Medium*. <https://medium.com/digital-health-nigeria/health-tech-entrepreneurs-must-be-patient-autopsy-of-a-failed-nigerian-health-tech-startup-48e2eb2dd88e>
- Neupulse. (2023). Lewis Capaldi visits the Neupulse office to try out our wearable wrist device. <https://www.neupulse.co.uk/lewis-capaldi-visitsneupulse/>
- Neupulse. (2024a). Improving the lives of people with Tourette Syndrome. Accessed February 20, 2025, from <https://www.neupulse.co.uk>
- Neupulse. (2024b). Solutions. Accessed October 08, 2025 <https://www.neupulse.co.uk/solutions/>

- Neupulse. (2025). Neupulse (pre-order). Accessed October 08, 2025 <https://neupulse.co/products/neupulse>
- NICE. (2025). Overview: Digital therapy for chronic tic disorders and Tourette syndrome: Early value assessment. *National Institute for Health and Care Excellence*. Accessed May 17, 2025, from <https://www.nice.org.uk/guidance/hte25>
- O'Dell, L. (2021). Deaf news: Frustrations as Instagram stories' automatic captions censor swear words. *The Limping Chicken*. Accessed November 11, 2025, from <https://limpingchicken.com/2021/05/07/deaf-news-frustration-as-instagram-stories-automatic-captions-feature-censors-swear-words/>
- Outcalt, S. D., Kroenke, K., Krebs, E. E., Chumbler, N. R., Wu, J., Yu, Z., & Bair, M. J. (2015). Chronic pain and comorbid mental health conditions: Independent associations of post-traumatic stress disorder and depression with pain, disability, and quality of life. *Journal of Behavioral Medicine*, 38, 535–543. <https://doi.org/10.1007/s10865-015-9628-3>
- Powell, R., Porter, H., Head, N., Thomas, E., & Mariette, S. (2025). Towards a Mad technoscience: Revealing, repurposing, and reimagining carceral mental health technologies. *Justice, Power and Resistance*, 1–18. (Published online ahead of print 2025). Accessed September 29, 2025, from <https://doi.org/10.1332/26352338Y2025D000000045>
- Price, M. (2015). The bodymind problem and the possibilities of pain. *Hypatia*, 30(1), 268–284. <https://doi.org/10.1111/hypa.12127>
- Pring, K., Malli, M., Hardy, B. W., Rapp, S. R., Storch, E. A., Mink, J. W., & Martindale, J. M. (2025). Reframing stigma in Tourette syndrome: An updated scoping review. *European Child & Adolescent Psychiatry*, 34(1), 1–21. <https://doi.org/10.1007/s00787-023-02332-3>
- Robertson, M. M. (2006). Attention deficit hyperactivity disorder, tics and Tourette's syndrome: The relationship and treatment implications. A commentary. *European Child & Adolescent Psychiatry*, 15(1), 1–11.
- Romig, K. (2025). Trump administration plans deep cuts to social security disability insurance, particularly for older workers. *Off the Charts: Policy Insight beyond the Numbers*. Accessed November 10, 2025, from <https://www.cbpp.org/blog/trump-administration-plans-deep-cuts-to-social-security-disability-insurance-particularly-for>
- Scherer, M. J. (2024). TechnoABLEISM versus TechnoENABLEISM. *Disability and Rehabilitation: Assistive Technology*, 19(3), 525–526.
- Shew, A. (2020). Ableism, technoableism, and future AI. *IEEE Technology and Society Magazine*, 39(1), 40–85. <https://doi.org/10.1109/MTS.2020.2967492>
- Shildrick, M. (2019). Critical disability studies: Rethinking the conventions for the age of postmodernity. In T. Chataika & D. Goodley (Eds.), *Routledge handbook of disability studies* (pp. 32–44). Routledge.
- Shiu, C., Chen, W.-T., Kim, B., Ricketts, E., Stiede, J. T., Espil, F. M., Specht, M. W., Woods, D. W., & Piacentini, J. (2023). The roles of lifetime enacted stigma in tic symptoms among young adults with Tourette syndrome. *Movement Disorders Clinical Practice*, 10, 1759–1768. <https://doi.org/10.1002/mdc3.13900>
- Siyang, Z., Dong, T., Xiantao, T., & Guangyi, X. (2025). Global bibliometric analysis of Tourette syndrome research (1960-2024): Trends, collaborations and emerging themes. *Frontiers in Neurology*, 16(2025), 1–14. <https://doi.org/10.3389/fneur.2025.1564511>
- Stalzer, A. (2025). Harm through stigma: Commander notification of service members' mental health. *Ethics & Behavior*, 35(2), 89–96. <https://doi.org/10.1080/10508422.2024.2405906>
- Turn2Us. (2025). Changes to disability benefits explained. *Turn2Us*. Accessed August 21, 2025, from <https://www.turn2us.org.uk/about-us/news-and-media/latest-news/changes-to-disability-benefits-explained>
- Up The Flue. (2025). PETALING JAYA: Government reverses disability support plan as funding cuts hit PWD and tax relief reduced. *Up The Flue*. Accessed November 10, 2025, from https://www.uptheflue.co.uk/?sport-news-279755-2025-10-10-petaling-jaya-government-reverses-disability-support-plan&srsrtid=AfmBOopMEAAMC1u0r7uAvoOYwL2wEEjZla0fU9j6ck8sPrROqwqhX_RV
- van Hoorn, A. C. (2020). Could affect regulation via vagal nerve self-stimulation be a maintaining factor in non-suicidal self-harm? *Medical Hypotheses*, 136, 109498. <https://doi.org/10.1016/j.mehy.2019.109498>
- Viney, W., Callard, F., & Woods, A. (2015). Critical medical humanities: Embracing entanglement, taking risks. *Medical Humanities*, 41(1), 2–7. <https://doi.org/10.1136/medhum-2015-010692>
- Whitney, D. G., & Shapiro, D. N. (2019). National prevalence of pain among children and adolescents with autism spectrum disorders. *JAMA pediatrics*, 173(12), 1203–1205. <https://doi.org/10.1001/jamapediatrics.2019.3826>