

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

Biomedical Journal

journal homepage: [www.elsevier.com/locate/bj](http://www.elsevier.com/locate/bj)

## Editorial Note: Special Edition

# Changing life styles for children with Tourette syndrome

Huei-Shyong Wang <sup>a,b,\*</sup>

<sup>a</sup> Division of Pediatric Neurology, Chang Gung Children's Hospital at Linkou, Taoyuan, Taiwan

<sup>b</sup> College of Medicine, Chang Gung University, Taoyuan, Taiwan

Tourette syndrome (TS) is a common neurodevelopmental disorder presenting with tics as the hallmark in children with a prevalence rate of 0.5–2% [1,2]. TS is often comorbid with attention deficit hyperactivity disorder [3], obsessive compulsive disorder, self-injurious behavior, sleep disorder [4], and developmental coordination disorder [5,6]. Most children with TS have excessive brain activities with ordinary or not appropriately active coordination systems perhaps due to the structural and functional changes in their basal ganglia and/or cerebellum [7]. The exact mechanism is not clear yet. No anti-tic pharmacological agent has achieved a cure efficiently [8]. On the other hand, non-pharmacological managements including behavior therapy and deep brain stimulation have been suggested. Till now there is no definite way to cure tics. People with TS must deal with tics for a year to a whole life [2]. In their childhood, patients with TS feel plain and boring in livings. They usually have a lot of energy at the end of the day though they may have many activities like painting, playing with Legos, smartphone, iPad, e-game, watching TV, and various indoors activities. Lying down or sitting on the couch or bed with continuous outbursts of tics is commonly found in children with TS. Tics become the major form of physical activities of them. Based on this observation, large amount of physical activities may play a role in ameliorating tics in these particular children [3,9,10].

Any sports, including baseball, biking, dancing, jogging, skating, squashing, swimming, et cetera, may be helpful [9,10]. The Taiwan Tourette Family Association (TTFA), established in 2002, proposed a unicycle-riding project as a major physical activity for children with TS since 2010. The

goal of improvement of the coordination and self-esteem of these children was achieved unexpectedly early in this project. Unicycle hockey and basketball are two of many formal, international campaigns which are not related to TS. In 2018, six children (4 boys and 2 girls, aged 8–15 years) of TTFA won copper medal of unicycle hockey campaign in **The 19th Unicycling World Championships and Convention (UNICON 19)** which was held at Ansan, Korea [11]. It is surprising that 5 of the 6 kids were free of tics and comorbidities, and the remaining one has trivial symptoms for more than 3 years since then. Changing life style by introducing more physical activities may help the children with TS to reduce the frequency and degree of the associated tics and comorbidities.

The life styles of children with TS may be changed according to different ages as below:

1. Preschool years: safe labor works such as mopping the floor with a rug instead of a mop.
2. School years: 2hrs of physical activity at least daily to achieve doubling of basic heart rate or one hour of unicycle-riding daily with gradual increase of duration and levels.
3. Occupation in adulthood: to be an athlete, farmer, performer, or a physician that needs intensive physical activities or concentrated spirit may be a choice of the patients with TS.

Strong familial tendency was found in children with TS, however, no defect in particular genes have been concluded up to now. In this issue, we invited Dr. Chou and her

\* Corresponding author. Division of Pediatric Neurology, Chang Gung Children's Hospital at Linkou, 5 Fusing St., Gueishan, Taoyuan 333, Taiwan.

E-mail address: [wanghs444@cgmh.org.tw](mailto:wanghs444@cgmh.org.tw).

Peer review under responsibility of Chang Gung University.

<https://doi.org/10.1016/j.bj.2022.03.007>

2319-4170/ 2022 Chang Gung University. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

colleagues to review the contemporary findings of genetics of TS for us [12]. Combining the genetic concepts and clinical practice of our own, the children with TS may lead a fruitful life as the normal population.

---

#### REFERENCES

---

- [1] Wang HS, Kuo MF. Tourette syndrome in Taiwan: an epidemiological study of tic disorders in an elementary school at Taipei County. *Brain Dev* 2003;25 Suppl 1:S29–31.
- [2] Lee MY. Living with tics: nursing care of pediatric Tourette syndrome. *Biomed J* 2022;45:280–5.
- [3] Chan YS, Jang JT, Ho CS. Effects of physical exercise in children with attention deficit/hyperactivity disorder. *Biomed J* 2022;45:265–70.
- [4] Blaty JL, DelRosso LM. Tourette disorder and sleep. *Biomed J* 2022;45:240–9.
- [5] Khalifa N, Von Knorring AL. Psychopathology in a Swedish population of school children with tic disorders. *J Am Acad Child Adolesc Psychiatry* 2006;45:1346–53.
- [6] Smits-Engelsman B, Verbecque E. Pediatric care for children with developmental coordination disorder: can we do better? *Biomed J* 2022;45:250–64.
- [7] Tikoo S, Suppa A, Tommasin S, Gianni C, Conte G, Mirabella G, et al. The cerebellum in drug-naive children with Tourette syndrome and obsessive–compulsive disorder. *Cerebellum* 2021 Sep 30:10.1007/s12311-021-01327-7.
- [8] Nomura Y. Pharmacological therapy for Tourette syndrome: what medicine can do and cannot do. *Biomed J* 2022;45:229–39.
- [9] Nosratmirshekarlou E, Shafiq S, Goodarzi ZS, Martino D, Pringsheim T. Effect of diet, exercise and sleep on tic severity: a scoping review protocol. *BMJ Open* 2019;9:e024653.
- [10] Kim DD, Warburton DER, Wu N, Barr AM, Honer WG, Procyshyn RM. Effects of physical activity on the symptoms of Tourette syndrome: a systemic review. *Eur Psychiatr* 2018;48:13–9.
- [11] Unicon 19. The 19th unicycling World Championships and convention, <http://www.unicon19.kr/en/unicon19/>; 2018 [accessed 10 August 2018]
- [12] Lin WD, Thai FJ, Chou IC. Current understanding of the genetics of Tourette syndrome. *Biomed J* 2022;45:271–9.