

# Prevalence of motor disorders and repetitive movements among children with Autism spectrum disorders and Tics disorders

*Kostiantyn Dubovyk*

Ukrainian Research Institute of Social and Forensic psychiatry and Drug Abuse

**Background.** Children with autism spectrum disorders (ASD) have difficulties in the development of simulating, gross and fine motor skills, hand-eye coordination and language skills. Tics and repetitive movements often associated with ASD, intellectual deficiency.

**Aim.** To identify a relationship between tic disorders and specific developmental disorders: motor skills, speech, cognitive functions in children with ASD.

**Methods.** There were randomized 79 children aged 4-6 years with ASD, 38 children among them with comorbid tics disorders (TD). For the diagnosis of ASD were used diagnostic criteria of ICD-10, Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS). The development of motor skills, speech, and cognitive function was assessed using Psycho-educational Profile (PEP-R). For the diagnosis of comorbid mental disorders were conducted using The Development and Well-Being Assessment (DAWBA). As motor disorders considered tics, abnormal movements associated with ADHD, anxiety and obsessive-compulsive disorders. Tics were assessed by Yale Global Tic Severity Scale (YGTSS).

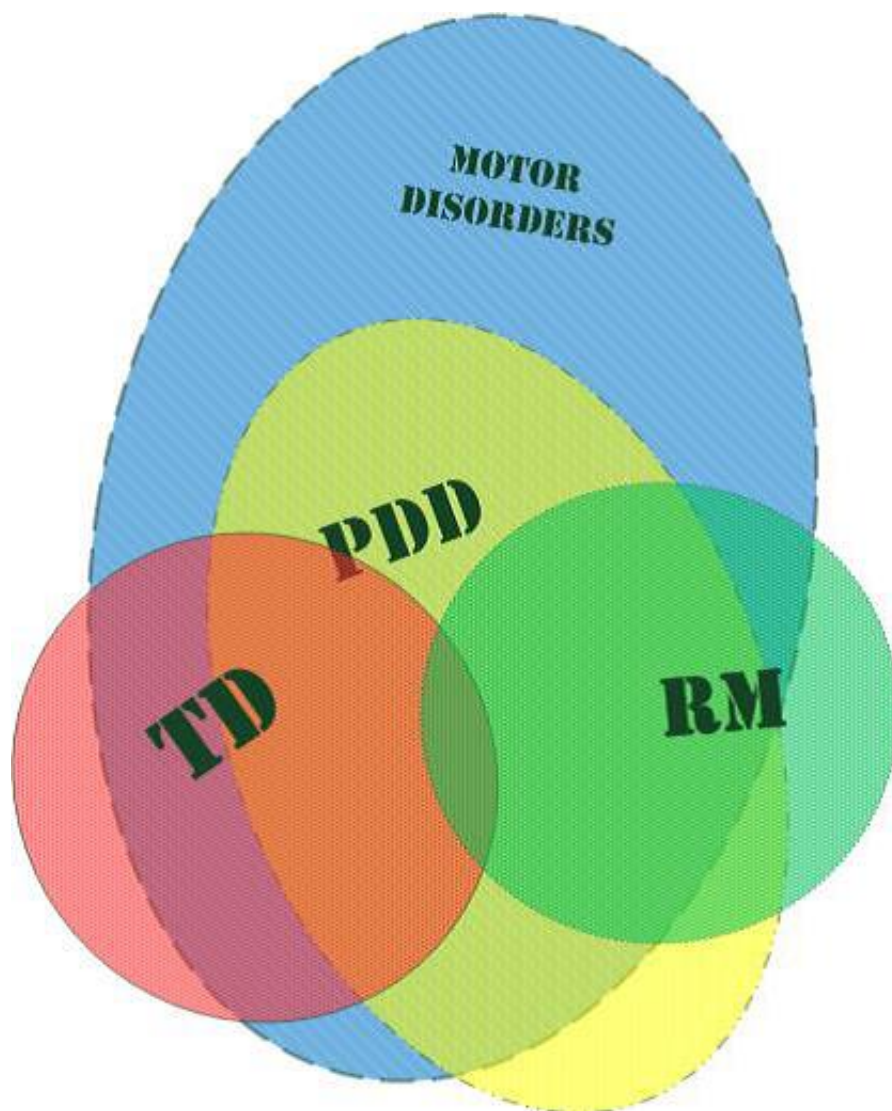
**Results.** In children with ASD and comorbid TD was noted retardation of formation of gross motor skills in comparison with the control group by PEP-R. It was also noted delay in the formation of skills in receptive speech and gross motor skills in accordance with the results of evaluation by using Vineland-II.

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## Background

Childhood-onset neuropsychiatric disorders, commonly lumped together under the concept of neurodevelopmental disorders (NDDs), affect at least 7–10% of all children [1]. They have traditionally been considered as distinct and separate from each other, each with a course of its own. However, the term Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examinations (ESSENCE) has been suggested in order to emphasize the clinical reality of children as manifestations of one or more major developmental symptoms before the age of 5 often implies problems in the same or an overlapping area later in life [1]. Today it is acknowledged that NDDs share symptomatology [1, 2] follow a waxing and waning course [3], and can be unstable within a diagnostic category over time [4, 5]. In addition, NDDs share predisposing environmental and genetic factors with each other [6], and they are dimensionally distributed in the population [7].

Autism Spectrum Disorder (ASD) and Tic disorder (TD) were assigned to the ESSENCE group of disorders along with ADHD and ODD. These disorders are sharing clinical and behavioral features as well as affecting children's development [1]. In the same time prevalence of comorbidity between ASD and TD varies widely depending on the "primary diagnosis" [8]. Both ASD and TD are characterized by repetitive movements and motor skills impairment that makes it difficult for differential diagnosis, especially in preschool children.



**Picture 1.** Prevalence of motor disorders and repetitive movements among children with ASD and TD. PDD - pervasive develop disorders; TD - tics disorders; RM - repetitive movements.

The aim of the study was to describe the effect of tics on delay in development of motor skills, speech, and cognitive functions.

## **Material and methods**

This study demonstrates the preliminary results. On the moment were randomized 79 children 48-72-month-old (M=59,73 SD=7,63) with Autism Spectrum Disorder (ASD). Among these children, 38 had a diagnosis of comorbid Tic disorder (TD) and were characterized as having severe quality motor function impairments (fine motor skills and hand-eye coordination).

Development and Well-Being Assessment (DAWBA) was used in all children for the screening of ASD and possible comorbidities. All children with IQ less than 50 and presence of other comorbid disorders except Tic disorder were excluded from the study. The presence of ASD was confirmed according to the results of Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS) and ICD-10 criteria, while the presence of Tic disorder was confirmed according to Yale Global Tic Severity Scale (YGTSS) and ICD-10 criteria. The development of motor skills, speech, and cognitive function was assessed by Psycho-Educational Profile-Revised (PEP-R) and Vineland Adaptive Behavior Scales—Second Edition (Vineland II).

Statistical analysis was performed in SPSS. Descriptive statistics were performed for both groups. All data were checked for normality with Kolmogorov-Smirnov test. T-test for unpaired samples was used to compare groups with normal distribution and U Mann-Whitney for samples with not normal distribution.

## Results

In children with ASD and comorbid TD was noted retardation of formation of gross motor skills in comparison with the control group by PEP-R. It was also noted delay in the formation of skills in receptive speech and gross motor skills in accordance with the results of evaluation by using Vineland-II. Results of the analysis are presented in [Tab.1](#)

Age (months)		58,83 (56,52; 61,13)	60,71 (58,09; 63,33)	.295
PEP-R	Imitation	39,54 (36,86; 42,21)	37,66 (34,16; 41,15)	.343
	Fine motor skills	42,73 (39,38; 46,08)	37,87 (35,02; 40,72)	.031
	Gross motor skills	47,85 (44,58; 51,13)	46,50 (42,57; 50,43)	.496
	Hand-eye coordination	50,46 (47,35; 53,58)	42,63 (39,40; 45,87)	.001
	Communication of speech	38,41 (35,60; 41,23)	31,97 (29,23; 34,72)	.004
Vineland II	Receptive	47,15 (42,80; 51,49)	45,95 (42,01; 49,89)	.839
	Expressive	34,71 (32,58; 36,83)	30,58 (28,65; 32,51)	.01
	Interpersonal relationship	27,27 (24,59; 29,94)	24,39 (22,19; 26,60)	.22
	Play and leisure	31,90 (29,76; 34,04)	26,74 (24,45; 29,02)	.001
	Coping skills	44,24 (41,27; 47,22)	37,21 (33,60; 40,82)	.003
	Gross motor skills	36,78 (33,72; 39,84)	36,87 (33,62; 40,12)	.847
	Fine motor skills	34,66 (31,61; 37,71)	32,34 (29,83; 34,85)	.296

**Tab. 1.** Results of development of skills by PEP-R and Vineland II in groups of comparison.

This study doesn't describe the relationship between TD and ASD impairments, but the impact of tics on development delay on motor functions, speech, and socialization.

The results of the study are preliminary and further results will be corrected with the growth of the sample.

Most of ASD children are diagnosed as having tics at age of 5-6 years, while many of children without ASD are described as having transitory tics after the age of 2 years. It is important to note that many of children with ASD and TD at the age of 2-3 years were described as having different severe repetitive patterns of behavior.

We had not found any difference between two groups in Fine motor skills on Vineland, while on PEP-R two groups were significantly different. One of the possible explanations is that Vineland-II measures only those fine motor skills that are important for socialization.

## Conclusion

Children with ASD and comorbid TD are often at the age of 2-3 years (Peak time of ASD symptoms recognition) are described as having various repetitive disorders (stereotyped movements and echolalia) instead of the motor or vocal tics.

## Additional information

## Competing interests

The author declares that no competing interests exist.

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