

# PROGRESS IN PSYCHOMOTOR FUNCTION OF CHILDREN ATTENDED AND DID NOT ATTEND DEVELOPMENTAL THERAPIES

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## Background

Autism spectrum disorders (ASD) is a term used to describe a social communication deficits and repetitive sensory-motor behaviours [5]. According to DSM-5, to be diagnosed with ASD a person might have evidences of past or present difficulties in three social sub-domains: socio-emotional reciprocity, verbal communicative behaviours and in developing, maintaining and understanding relationships. In addition, a person should have difficulties in two of four different restricted, repetitive sensory-motor behaviours [6]. Although since the definition in 1943, the description of core features of ASD did not change, number of people diagnosed with disorders increases from year to year. Prevalence of children and adolescents having ASD in 2014–2016 USA was 2.47% (95% Confidence Interval, CI 2.20–2.73) according to the National Health Interview Survey, and it was higher in boys than in girls [8]. In the case of consistently growing number of children diagnosed with ASD, the coordination between health-care, educational system and other services is necessary. Recently, a growing evidence on positive effect of different kinds of interventions performed for children with ASD appeared in scientific journals. Proposed therapies included social behavioural therapies [7], nutria and dietary intervention [1], cognitive behavioural therapies [2] and gene therapy [3]. Despite of a growing

number of performed studies, the effect of therapies in the case of ASD is not fully proven, and the need for studies of effects of intervention therapies remain urgent. On the other hand, nothing is known about a possible effect of therapies on children with normal cognitive and psychomotor development.

## **Purpose**

The purpose of the current study was to compare a progress in psychomotor function between those attended different kinds of therapies and those that did not attend any therapy.

## **Materials and Methods**

### ***Study design and participants***

The study sample consisted of children 2–5 years old that attended the Children Clinical University Hospital and the Social Paediatrics Centre of the University of Latvia at 2013–2015. The only inclusion criterion was willingness of parents to participate in the study.

All children were diagnosed for presence of ASD according to DSM-5 definition by psychiatrist. Two additional assessments of child development were performed by child physician using the Denver functional test [4] modified for Latvian participants. Denver functional test assessed social/personal fine motor functions, language, and gross motor functions [4]. Using the modified version, we assessed next psychomotor categories: hearing perception disorders, visual perception disorders, language development disorders, small motor disabilities, and gross motor development and daily operations. In addition, parents of children fulfilled a structured questionnaire that allowed to assess compliance of child development and behaviour to age norms.

After the initial assessment, children participated in different types of therapies according to their needs and based on recommendations of child's physician and willingness of parents. Parents had next possibilities to choose a therapy: sessions with a special teacher, Montessori therapy, sand therapy, water treatment, dance movement therapy, and anima assistant therapy.

The final assessment was performed using the Denver functional test 6–8 months after the baseline examination. The examination was

performed by the same psychiatrist and clinical psychologist that assessed children during the baseline examination. Differences in psychomotor functions were registered and further analysed using the SPSS software.

### ***Statistical analysis***

Descriptive statistic was performed for all study variables. For age, median and range were presented. For other variables, frequencies and percentage was presented for each category. Chi-square test was used to investigate the relationships between the child diagnosis and a type of the therapy, that child received, and Kruskal-Wallis test was used to compare age of children that received different therapies. We used an independent t-test to investigate the relationship between age of a child and compliance of his development to age norms. We compared psychomotor abilities of children that received any kind of therapy with those that did not attend any therapy using a Chi-square test. The level of significance was considered as 0.05. We used an SPSS program (version 22) for statistical analysis.

### **Results**

Study sample consisted of 100 children with the median age of 4 (range from 2 to 5). Twenty-three percent of children had a development according to their age norms, but for others the development was lower than that for age norms. There were no relationships between the age of child and his compliance to the age norms of development ( $t = -1.40$ ;  $p = 0.16$ ). Twenty-eight children were recognized as healthy, 16 were diagnosed with atypical autisms, 38 – with infantile autisms, and additional 18 had other diffused development disorders. Thirty-eight children do not receive any kind of therapy (29 children considered as healthy and additional 10 with a diagnosis of infant autisms), while sixty-two others received different kinds of therapy (Table 1). Groups of children that did not attend a therapy and children that attended any kind of therapy did not differ by gender, but differed by compliance of development to age norms (better in those that did not attend a therapy) and by initial diagnosis: there were healthy children only in the group that did not attend therapies (Table 1).

There was a significant difference in progress of psychomotor function between children that attended any kind of therapy and those that did not attended a therapy. In all five checked psychomotor abilities

children that attended a therapy showed improvement, however, those that did not attend any therapy did not display any improvement during the whole period of the study ( $p < 0.01$ ). The most progress was seen in fine motoric in children that attended therapies (Table 2).

**Table 1.** Description of study participants

| Variable  | All children<br>(N = 100) | Children that<br>did not attended<br>therapies | Children that<br>attend any<br>therapy | Difference<br>between<br>groups |
|---|---------------------------|--|--|---------------------------------|
| Age, median [min;<br>max]                           | 4.0 [2.0; 5.0]            | 4.0 [2.0; 5.0]                                 | 4.0 [2.0; 5.0]                         | 0.38                            |
| Compliance of<br>development to age<br>norms, N (%) | 23 (23)                   | 21 (55.3)                                      | 2 (3.2)                                | < 0.01                          |
| Initial diagnosis, N (%)                            |                           |  |  | < 0.01                          |
| Healthy   | 28 (28)                   | 28 (73.7)                                      | 0                                      |                                 |
| Atypical autisms                                    | 16 (16)                   | 0  | 16 (25.8)                              |                                 |
| Infantile autisms                                   | 38 (38)                   | 10 (26.3)                                      | 28 (45.2)                              |                                 |
| Diffused disorders                                  | 18 (18)                   | 0  | 18 (29.0)                              |                                 |

**Table 2.** Improvement in psychomotor abilities as a result of a therapy

| Psychomotor abilities<br>(N, %) | Children that did not<br>attend any therapy<br>(N = 38) | Children attended<br>therapies<br>(N = 62) | Difference<br>between<br>groups |
|---------------------------------|---|--|---------------------------------|
| Visual function                 | 1 (2.6)   | 25 (40.3)                                  | < 0.01                          |
| Hearing                         | 2 (5.3)   | 29 (46.8)                                  | < 0.01                          |
| Fine motor skills               | 3 (7.9)   | 32 (51.6)                                  | < 0.01                          |
| Gross motor skills              | 5 (13.2)  | 28 (45.2)                                  | < 0.01                          |
| Speech development              | 2 (5.3)   | 19 (30.6)                                  | < 0.01                          |

## Conclusions

Attending any kind of therapy is preferable for children to improve their psychomotor function. We propose to attend therapies/developmental activities not only to children with some problem like

ASD, but for healthy children as well, as it can improve their psychomotor functions and skills.

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