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### EXAMINATION AND IMPROVEMENT OF CHILDREN'S HAND FUNCTION IN A SHORT-TERM PHYSIOTHERAPY INTERVENTION

In the age of increasing technology, children spend much more time using digital devices than before (1). Children inherently have the skills of speech, writing and the basis for counting and verbal thinking (2). These are human-specific skills, and writing by hand has much more complexity than it seems. In the age of six to eight, child's hands are characterized by agility and skill, which is slowly becoming aware of this. As a result, they start to use them in a distinctive way and become capable of differentiating the right/left direction. This is the optimal time for writing teaching. The drawing hand then becomes a writing hand. It was found in the literature that hand movements are environmentally-dependent, learned modes of motion, as defined by the harmonious co-operation of several cortical areas (2, 3). Nowadays it is assumed that a significant portion of the children starting the first class is not perfectly prepared from locomotor aspect to learn regular writing.

#### AIM

The aim of this study was to improve the manual skills and fine motor skill proficiency by using physiotherapeutic methods expecting an improvement in the hand writing style. Further aim was to elaborate a methodological recommendation for teachers in first or second classes based on our results.

#### MATERIAL AND METHODS

Physical examinations directed to special skills of static balance, spatial coordination as well as the fine motor skills of the upper limbs were made before and after the intervention. The gross and fine motor skills were tested by using the Nine Hole Peg Test (NHPT) and the Quest test. The analysis of the hand writing was done by an independent teacher. Children (n= 34) from 2nd class in the elementary school

were selected and divided into target group with physiotherapeutic training (n=14), and to control group without any intervention (n=20). The intervention included a 10-week physiotherapy training in the target group.

#### RESULTS

It was found that the children's fine motor skill measured by NHPT was below the normative data (dominant hand: 20.3s; non-dominant hand: 22.3s) in both groups. In our study, the initial mean value for dominant hand was 23.8s in the control group, and 24.1s in the target group. For the non-dominant hand in the control group the time was 25.9s, in the target group 27.1s. After the intervention, we found significant decrease in the NHPT time for the dominant hand in the control group ( $p<0,05$ ) similarly to the target group. The non-dominant hand in the target group also showed significant change in positive direction ( $p<0,05$ ). According to

the evaluation by a teacher, the handwriting style became also better in both groups. Associated hand movements also showed improvement but it's not significant. The same non-significant result came out with the thumb independence test. The pencil grip didn't show any change.

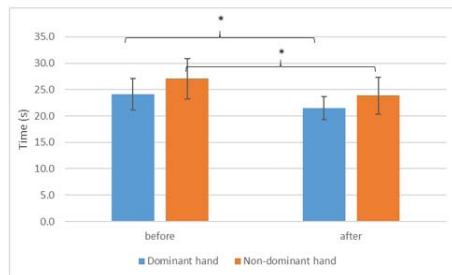


Figure 1. Nine Hole Peg Test scores before and after the intervention in the target group. Columns represent the mean values, the vertical bars indicate the SD.  $n=14$ ,  $*p<0.05$

## REFERENCES

1. Biddle, S., Pearson, N., Ross, G., & Braithwaite, R. (2010). Tracking of sedentary behaviours of young people: A systematic review. *Preventive Medicine*, 51(5), 345–351.
2. Lesóné Kónya, M. *Tükörtábla-terápia*, ELTE Eötvös Kiadó, Budapest, 2010
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## SUMMARY

This relatively short term and weakly repeated drills resulted positive change, but some changes were not significant. It can be assumed that a long-term training would have more considerable effect on the handwriting style and it should be started in an earlier age because some skills had already become definitive.