

Effects of a therapeutic seating device with a removable backrest on trunk control and participation in a child with trunk instability

A single case study

BACKGROUND

Adaptive seating devices (ASD) such as therapy chairs are used to not only provide orthopaedic support, but also allow participation in various activities of daily living (ADL). Most ASD have non-removable backrests leading to passive sitting. To improve muscular function and promote free movement of the trunk, a chair with a removable backrest has been developed. The purpose of this study is to determine whether regular sitting with pelvic support, but no backrest improves muscular function of the trunk in a child with trunk instability.

METHODS

Study design: Single case pilot study with ABA – Design (Fig. 1). Ethics approval received by the University of Applied Sciences Osnabrück

Participant: 9-year-old child with bilateral spastic Cerebral Palsy (CP) – GMFCS IV, global developmental delay, Chiari-III Malformation

Assessments (phases A1 and A2):

- Segmental Assessment of Trunk Control (SATCo)
- Dynamic Reaching Part of the Trunk Control Measurement Scale (TCMS), objectified using inertial measurement units (IMU)
- Participation: Subset of the School Function Assessment (SFA)
- Logbook for additional observations with photos

Intervention (phase B):

The child sat without a backrest für 1 hour per school day, participating in everyday school activities in the morning (Fig. 2, 3 and 4)

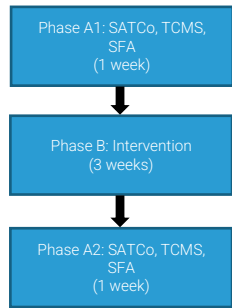


Fig. 1 ABA-Phase Design



Fig. 2 Sitting without a backrest in the classroom setting



Fig. 3 Looking at a picture card



Fig. 4 Sitting at the table

RESULTS

- SATCo: highest possible score of 20 points at baseline and endline (Fig. 5)
- TCMS Score: improved from four to six points, quicker execution of some tasks (Fig. 6 and 7)
- Without the backrest the child used the freedom of trunk movement
- Objective data from IMU data showed high variability in movements during a test day and in between test weeks
- The SFA score decreased by 2 % (from 52 to 50 points, total reachable points: 128)

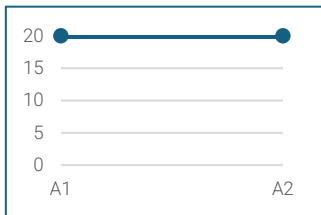


Fig. 5 SATCo Score

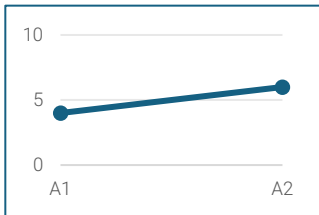


Fig. 6 TCMS Score

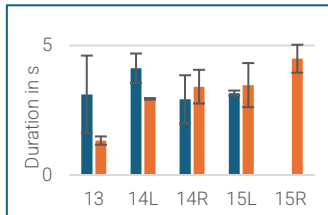


Fig. 7 TCMS Task duration (M ± SD) in phase A1 (blue) and A2 (orange)

DISCUSSION

- The results were heavily influenced by the communicative abilities of the child
- Using IMUs to objectify the results is hard due to the variability of movement shown in children with CP
- Observation of the participation showed improved opportunities to participate in classroom activities

TAKE HOME MESSAGE

- Using a therapeutic chair without a backrest can encourage active and variable sitting positions
- The freedom of trunk movement might enhance chances of participation
- Further studies with longer intervention periods and more participants are required to gain better observational results

ACKNOWLEDGEMENT

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