The effect of interactive computer play on balance and functional abilities in children with moderate cerebral palsy: a pilot randomised study

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Children with cerebral palsy (CP), regardless of their severity, have problems of postural control in sitting and standing, which in turn affect their function and participation in daily life. Interactive computer play (ICP) has become a popular rehabilitation modality to improve postural control and/or balance in children with CP. Positive findings have been shown in postural control and balance in children with CP after ICP but its effect on children with moderate severity of CP, i.e. Gross Motor Function Classification Scale (GMFCS) levels III or IV, is largely unknown. The medium- to long-term effect of ICP is also unknown.

Objectives:
To investigate the feasibility and potential efficacy of a 6-week ICP training on balance and gross motor function in children with moderate CP using a pilot single-blinded matched randomised controlled study.

Participants:
18 children with CP of GMFCS level III or IV were recruited, paired according to age and GMFCS level and randomised into intervention or control groups. The intervention group received additional trunk control training using the ICP in sitting 4 times per week, 20 minutes per session for 6 weeks. All study children continued their usual physiotherapy programme. All study children were assessed at baseline, week 3, week 6 (completion of intervention) and week 12 using the following:
- Pediatric Reach Test (PRT) in sitting
- Gross Motor Function Measure-66 Item Set (GMFM-66 IS)
- 2-minute walk test (2MWT) for children of GMFCS level III only

Results:
All children were assessed at all time points and all intervention children completed and enjoyed the training with no reported adverse event. No significant difference was found between the two groups in all assessments. Both groups of children showed significant improvements in the GMFM-66 IS between week 3 (intervention group: 53.41 SD 5.34; control group: 52.86 SD 8.33) and week 6 (intervention group: 55.00 SD 6.32; control group: 54.20 SD 8.35). Significant time difference was found in the PRT forward (p=0.035) and left (p=0.048) in the control group.

Discussion:
- There were some difficulties in recruiting children to the study as the children were required to have a reasonable level of cognitive function to participate in the ICP and cognitive impairment is one of the commonest co-morbidities of CP, especially those with greater severity.
- There was no added benefit found from the additional 6-week ICP training as children in both groups generally improved their sitting balance and functional gross motor skills over the 12-week period. It is possible that children with mild CP may have sufficient inherent trunk control to benefit from the specific postural control training of ICP leading to the reported improvements in balance and gross motor function in the past literature. Half of the intervention children in this study showed stereotyped co-contraction of all trunk muscles, greatly compromising to effective trunk control learning using ICP.

Conclusions:
The intervention protocol of a 6-week ICP training was feasible and safe for children with CP of GMFCS level III or IV in special school settings. Future studies with larger sample sizes or using single subject designs are recommended.