Aim

To determine the effects of 6 ADC sessions on lower limb muscle strength in children with CP.

Method

Ethical approval was provided by the School of Healthcare Studies Research Ethics Committee, Cardiff University. Parents and children volunteered to participate following a Pedal Power cycle assessment for a suitable cycle with appropriate adaptations. Children with CP aged 2–18 were included while those who had undergone lower limb surgery or received botulinum toxin injections within 6 months of the study were excluded. In a same subject experimental design, bilateral quadriceps and hamstrings strength was measured in sitting at 90° knee flexion, using a hand-held dynamometer (Figure 1). Strength was measured 4 times before and 4 times after participation in 6 ADC sessions. Children participated in 6 ADC sessions over 8 weeks, cycling in a traffic free city park, increasing time and distance cycled as able (Figure 2).

Results

Participants were nine children with CP: 4 boys and 5 girls, aged 2.6–17.8 years (mean: 9.46; SD: 5.56). Gross Motor Function Classification Scale Levels (Palisano et al, 1997) ranged from I – IV. Pre- and Post-intervention strength values with standard deviations are presented in figures 3 and 4. Differences in bilateral Quadriceps and Hamstrings mean strength values were analysed using non-parametric Wilcoxon Rank Sign test, significance level set at p≤0.05.

Quadriceps strength changes were significant (Right p=0.018; Left p=0.021). Hamstring strength changes were not significant (Right p=0.065; Left p=0.069).

Discussion

This pilot study found significant differences in bilateral quadriceps strength following 6 sessions of ADC. Strength profiles in children with CP demonstrate those with weaker quadriceps and hamstrings mean strength values were analysed using non-parametric Wilcoxon Rank Sign test, significance level set at p≤0.05.

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References


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Pedal Power is a registered UK charity whose mission is to make cycling accessible to all. Pedal Power provides adapted cycles and opportunities to participate in adapted dynamic cycling (ADC). Participation in ADC may increase activity levels and lower limb muscle strength in children with CP. To date however, no research evidence on ADC for children with CP or potential effects of ADC on muscle strength has been identified.