Manual dexterity learning in children diagnosed as Benign Congenital Hypotonia

Eyal Tzioni¹, Roni Lidor¹, Yoram Sandhaus², Avi Karni¹
¹Department of Learning Disabilities, University of Haifa & ²Child Development Center, Maccabi Health Services, Israel

Introduction:
Benign Congenital Hypotonia (BCH) is a diagnosis by exclusion (no other neurological or musculo-skeletal deficit) at infancy¹. The leading symptom is an inability of the child to maintain posture against gravity. There’s some debate whether the condition is indeed benign and it is not known whether fine manual dexterity and skill acquisition are intact later in life.

Methods:
Participants: 14 children diagnosed in infancy as BCH, and 14 healthy controls, 7-8 year olds, were studied. Gender, school years & hand dominance were matched across groups.

Task & training-testing schedule:
A novel motor learning paradigm based on the Functional Dexterity Test (FDT)². The participants completed at least 18 blocks (repetitions) of peg manipulations using a version of the FDT set-up during the training session and 6 blocks on each re-test.
Each participant was tested in 3 consecutive sessions: A training session and 2 post-training sessions a) at 24-48 hours and b) at 6 weeks post-training.

Performance evaluation:
Dependent variables: speed (time, in sec., to invert all 16 pegs) & accuracy (number of errors according to categories (drop, touch, supination; 2nd hand assistance; body assistance)).

Results:
1. Both groups showed large, performance gains in terms of speed, with significant decrease in error rate.
2. Both groups showed similar learning rates (equal slopes for improvement in speed & accuracy).
3. In general, the BCH group was significantly slower and was more error prone.
4. On average BCH showed more “forgetting” during the retention intervals.

Conclusion: BCH children may have some motor learning deficits at 7-8 yrs.

1 Carbony et al, J. Ped Neurol, 26:383-6, 2002