



Centre de
Réadaptation
Marie-Enfant

CHU Sainte-Justine



Dance as an adjunct therapy to improve cognitive and psychosocial functions in children with neurological impairments

Claire Cherrière^{1,2,3} claire.cherriere@gmail.com, Mélissa Martel¹, Marie-Laurence Cyr¹,

Marie-Joanie Raymond¹, Louis-Nicolas Veilleux², Sylvie Fortin⁵, Martin Lemay^{1,6}

1. Marie-Enfant Rehabilitation Center, HUC Sainte-Justine Research Center of Montréal,

2. Neurosciences Dept., Toulouse 3 Paul Sabatier University, 3. Shriners hospital for children of Montréal

4. Surgery Dept., Mc Gill University, 4. Sciences of physical activity Dept. And Dance Dept., Université du Québec à Montréal



Introduction

Neurological disorders such as neuromuscular disease (NMD) or cerebral palsy (CP) have impacts on motor functions. However, cognitive and psychosocial functions could also be affected (Bottcher, 2010, Vanasse, 2004). Dance could be a promising approach.

Specificities of adapted dance :

- Highly enjoyable adapted physical activity (Lopez Ortiz, 2012)
- Beneficial for cognitive and psychosocial aspects (Dhami, 2013, Kattenstroth, 2015)

Objective : To improve cognitive and psychosocial dimensions in children with neurological disorders.

Methods

Development and implementation of three dance programs in children with NMD and adolescents with CP.

A) Population

Children with NMD

Inclusion criteria (7-13 yo, Charcot-Marie-Tooth (CMT) NMD, ability to walk)
Exclusion criteria (comprehension disorder, cardiac disease, recent surgery)

Program 1

- dance group (n=5 ; 9.5 (SD 2.2) yo)
- control group (n=4 ; 10.2 (SD 1.5) yo)



Program 2

- dance group (n=5 ; 9.8 (SD 1.0) yo)
- control group (n=5 ; 11.8 (SD 2.0) yo)



Adolescents with CP

Inclusion criteria (age : 12-20 yo, diagnostic : cerebral palsy, GMFCS I-IV)
Exclusion criteria (comprehension disorder, cardiac disease, recent surgery)

Program 3

- dance group :
- ambulant group : n=9, 16.2 (SD 2.3) yo
- non ambulant group : n=10, 14.2 (SD 1.4) yo



B) Dance programs

Duration : 10-12 weeks

Frequency : 60 minutes, 2 times / week

Dance styles : jazz, afro-contemporary, break dance, tap, zumba,

Typical dance session :

Warm up (10 minutes)

Choreographic workshop (40 minutes)

Warm down (10 minutes)

Breaks

C) Outcomes measured before and after dance programs

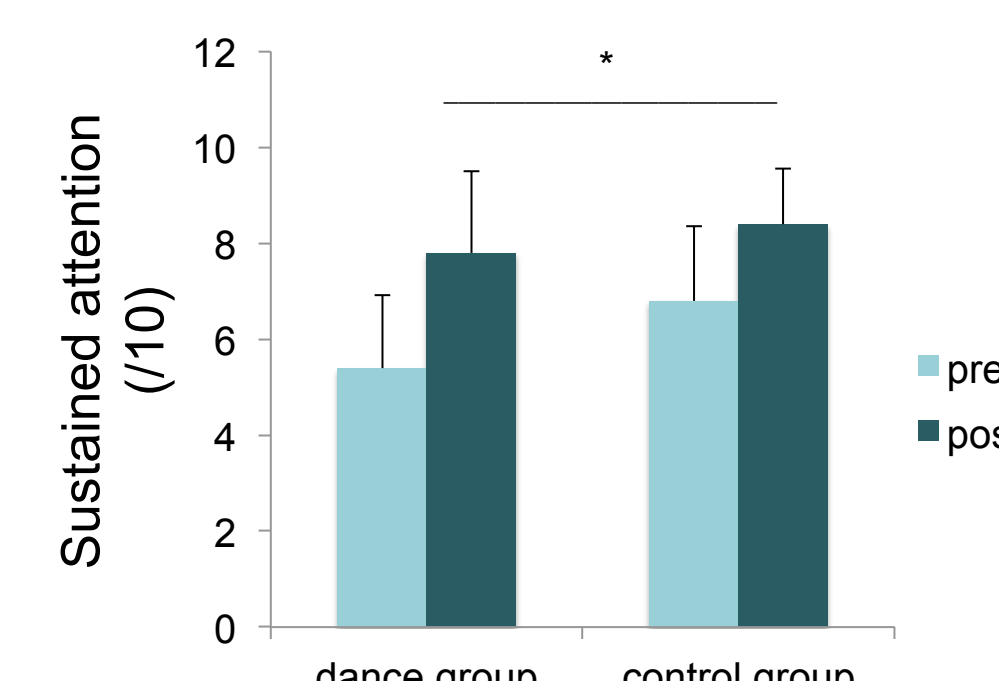
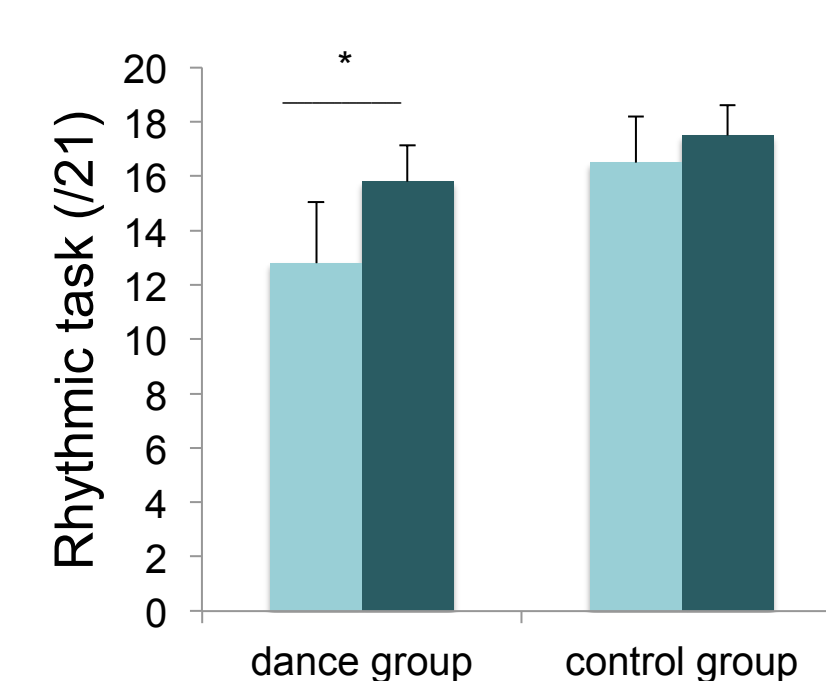
Dimensions	Outcomes	Tests	Program 1	Program 2	Program 3
Cognitif	Cognitive rhythmic task	Rhythmic structures reproduction (Stambak)	x		
	Simple and divided sustained auditory attention	Tea-Ch subtests	x	x	x
	Short term and working auditory memory	WISC-IV subtests	x		x
	Inhibition	Stroop			x
Psychosocial	General quality of life	PedsQL 4.0 questionnaire	x	x	



Results

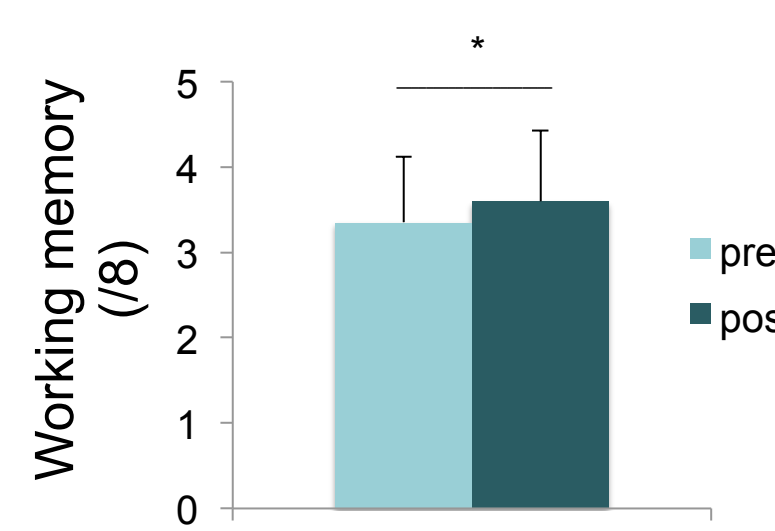
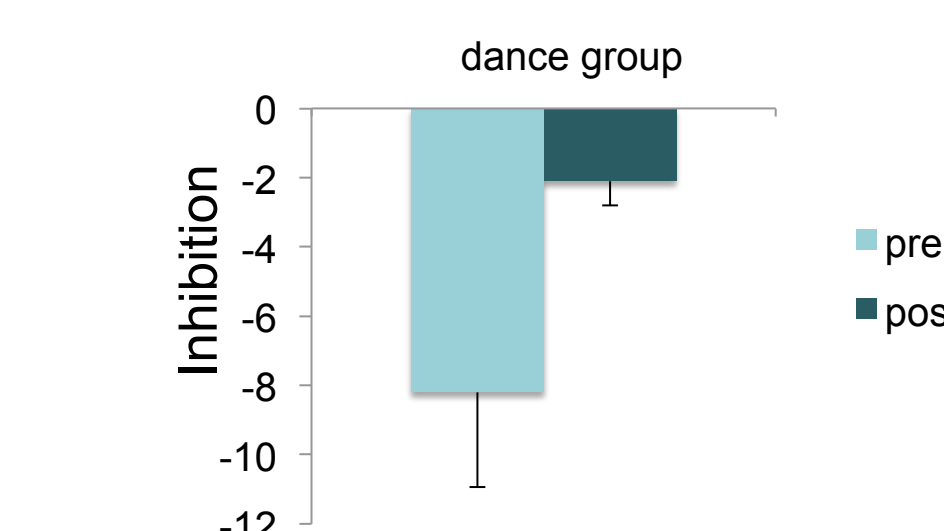
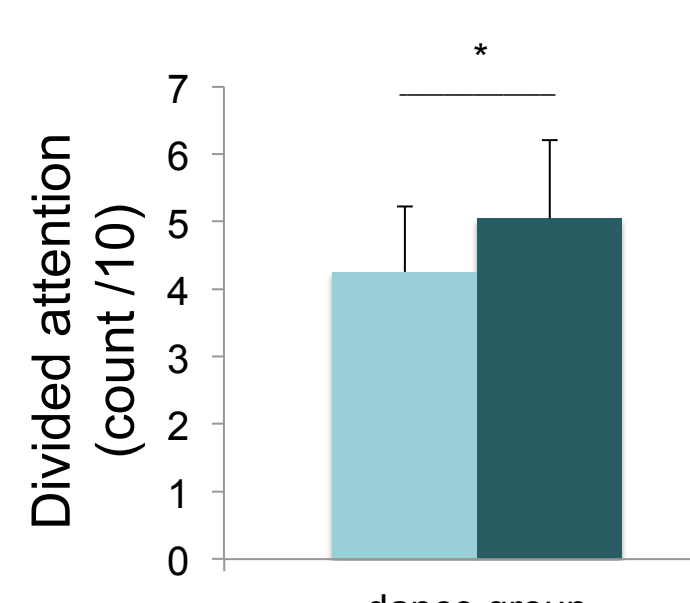
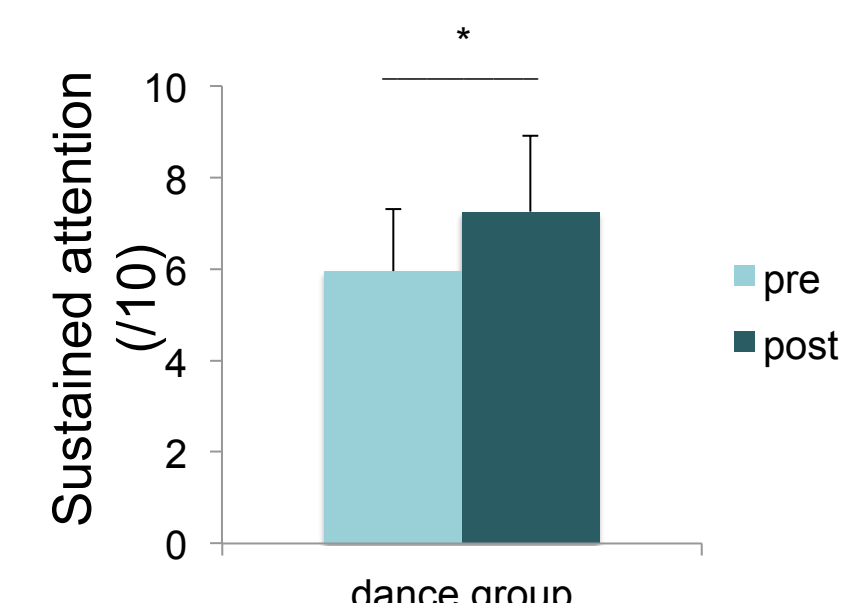
Cognitive functions

Children with NMD
(program 1)



Rhythmic task and sustained auditory attention ↗

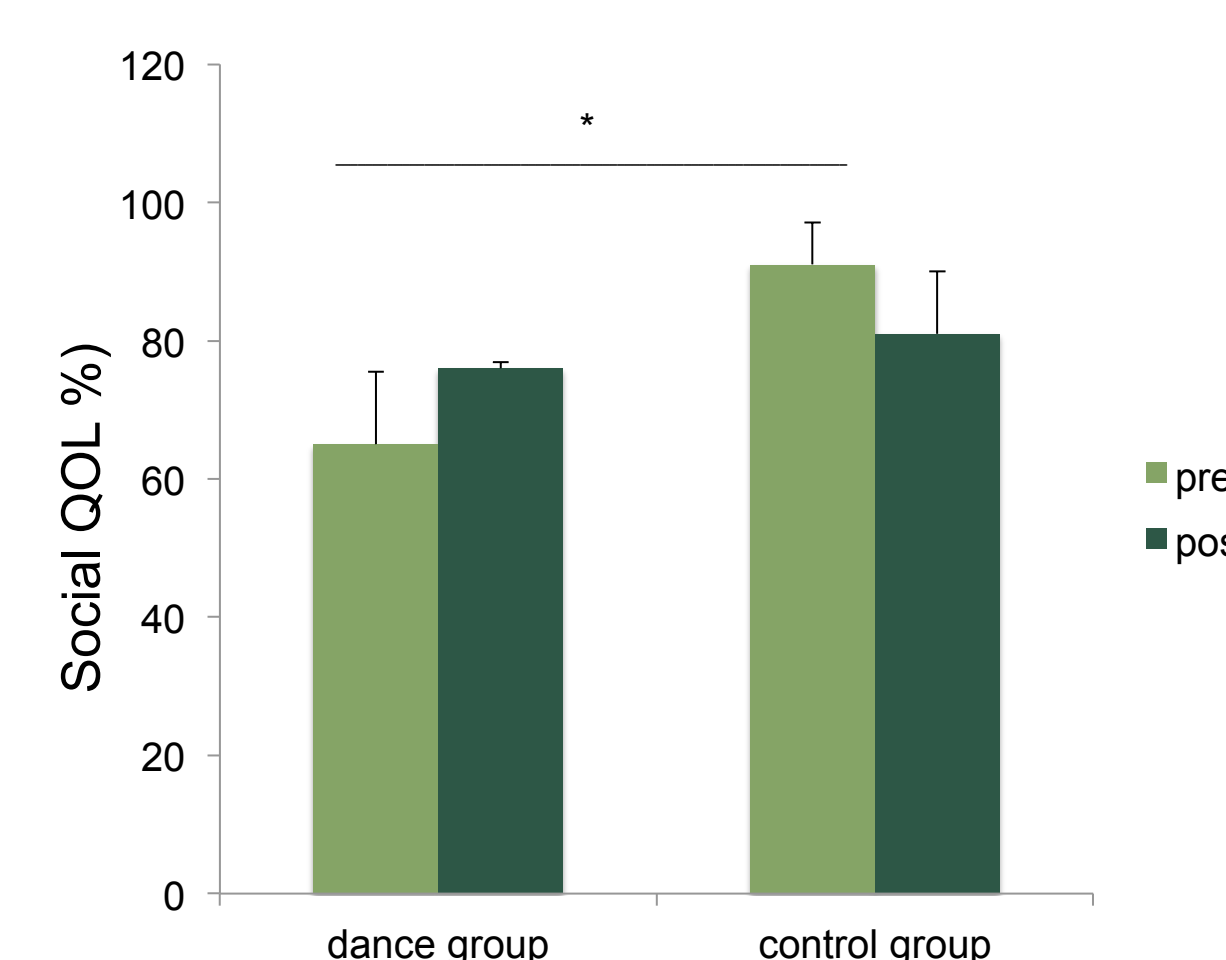
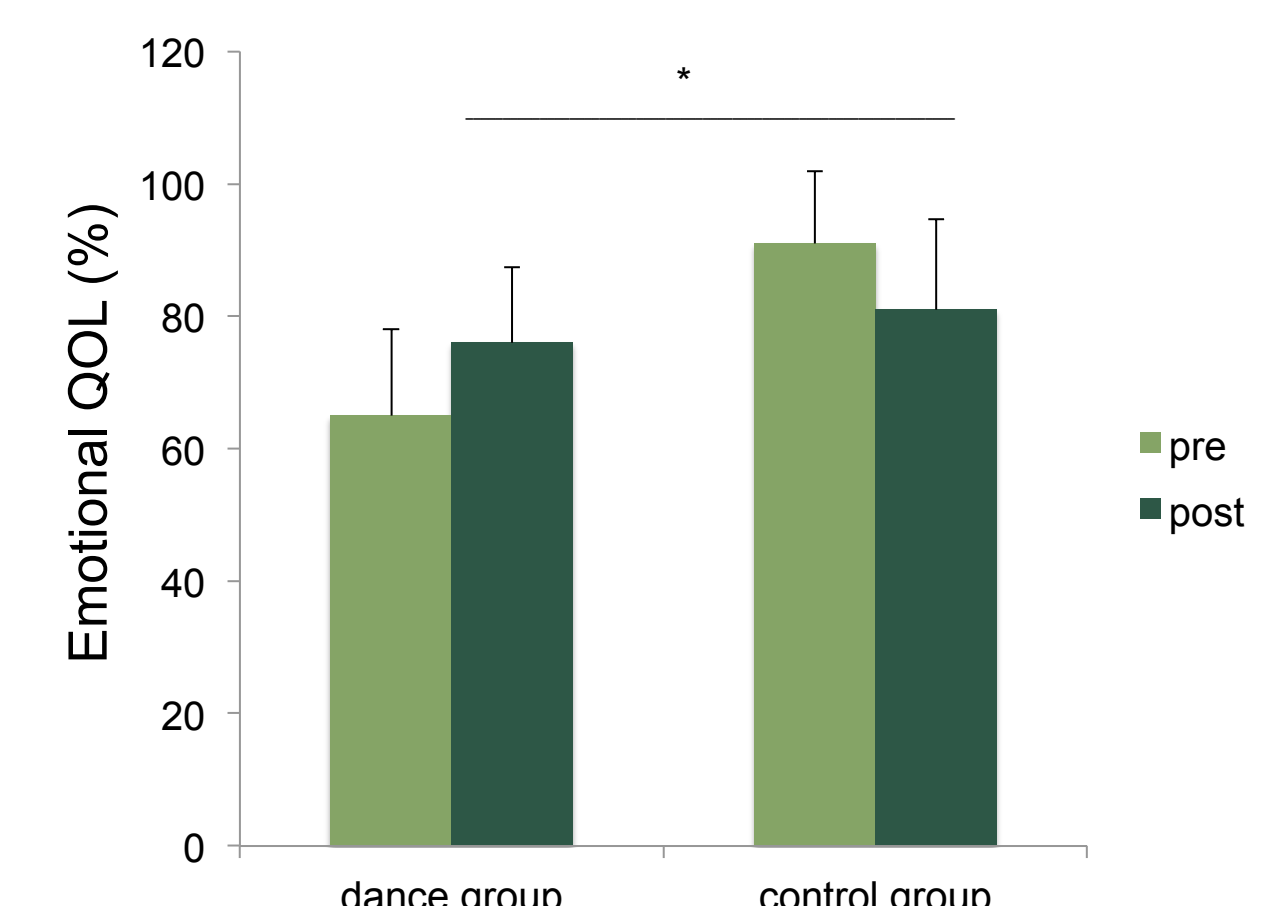
Adolescent with CP
(program 3)



Sustained and divided auditory attention, inhibition and working memory ↗

Psychosocial function

Children with NMD
(program 2)



Quality of life ↗

Conclusion

Dance programs improved **attention** in both populations with CMT NMD and CP. **Rhythmic abilities** improved in children with a CMT NMD while specific aspects of **memory** improved in children with cerebral palsy. **Emotional aspects of quality of life** was improved in children with NMD. Methodological limits in these studies account for the necessity to conduct other studies on adapted dance and young persons with neurological disorders.

Dance as an adjunct therapy in rehabilitation :

- Is **adapted** for children with a CMT NMD and for teenagers with CP
- Seems to **improve some cognitive functions and quality of life** for children with neurological impairments.

Références

Bottcher, L. (2010). Children with spastic cerebral palsy, their cognitive functioning, and social participation: a review. *Child Neuropsychology: A Journal on Normal and Abnormal Development in Childhood and Adolescence*, 16(3), 209-228. **Vanasse M** et al. Les maladies neuromusculaires chez l'enfant et l'adolescent. Montréal : Hôpital Sainte-Justine 2004 : 85-112, 193-208. **López-Ortiz, C.**, Gladden, K., Deon, L., Schmidt, J., Girolami, G., & Gaebler-Spira, D. (2012). Dance program for physical rehabilitation and participation in children with cerebral palsy. *Arts & Health*, 4(1), 39-54. **Dhami, P.**, Moreno, S., & DeSouza, J. F. X. (2015). New framework for rehabilitation " fusion of cognitive and physical rehabilitation: the hope for dancing. *Frontiers in Psychology*, 5. **Kattenstroth.** (2010). Superior sensory, motor, and cognitive performance in elderly individuals with multi-year dancing activities. *Frontiers in Aging Neuroscience*.