Children with Autism Spectrum Disorder Have Sustained Bone Deficits in the Radius and Tibia Shaft: 1-year Follow-Up

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Introduction

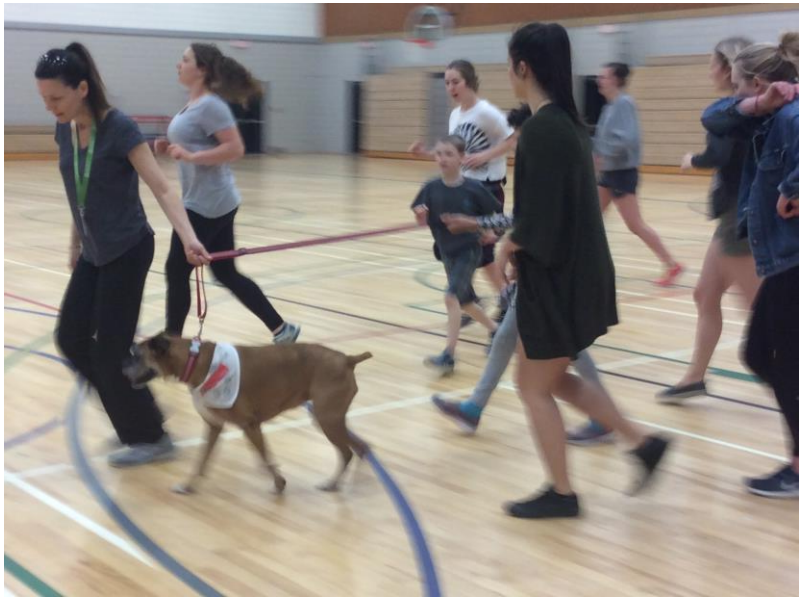
- Children with ASD have a higher risk of fracture[1]
- Lower reported physical activity (PA) in children with ASD[2-3] may contribute to bone deficits[4-5]
- Limited vigorous and impact-type activities and greater sedentary time may prevent children with ASD from gaining loading-stimulus required for optimal skeletal development[6]
- Presence of a therapy dog increased physical activity in children with obesity[7]

[1] Neumeyer et al. J Autism Dev Disord (2015) [2] Jones et al. PLOS ONE (2017) [3] Lee, S. H., & Hodge, S. R. J Phys Educ Sport Manag (2017) [4] Ekhlaspour et al. J Autism Dev Disord (2016). [5] Neumeyer et al. J Pediatr (2017) [6] Kontulainen et al. Am J Lifestyle Med (2013) [7] Wohlfarth et al. Front Psychol (2013)

Objective

- Assess the feasibility and efficacy of a therapy-dog intervention on physical activity and sedentary time in children with ASD

- We hypothesize that the presence of the therapy dog increases PA and number of impacts and decreases sedentary time in children with ASD



Methods

- Cross-over design for comparing of PA between sessions with or without therapy dogs
- 18 children (3 girls) with ASD (mean age 10.4, SD2.8 yrs)
- Children were randomized into two groups
- Groups were randomized to sessions with the presence of either 1 or 2 therapy dogs or no dog (1 weekly PA session for 7 weeks).
- We recorded attendance and parent feedback to assess feasibility

Methods

- Accelerometer-recorded (wGT3X-BT ActiGraph)
- We used validated cut-points in children[1-2]
  - Sedentary time
  - Light PA
  - MVPA
  - VPA
- Impact counts defined based on resultant accelerometer peaks ≥ 3.9 g[3-4]

[1] Evenson et al. J Sports Sci (2008) [2] Trost et al. Med Sci Sports Exerc (2011) [3] Kehrig et al. Appl Physiol Nutr Metab (2018) [4] Vainionpää et al. Bone (2007)

Statistical Analysis

- Repeated measures MANOVA were used to compare sedentary time, PA and the number of impacts across sessions without or with 1 or 2 therapy dogs
- With a significant omnibus effect of the sessions, we performed a post-hoc analysis contrasting PA outcomes between sessions
- Significance was set at $p<0.05$

Results

- Adherence to sessions was 91%
- The PA outcomes and sedentary time differed across the sessions ($p<0.001$)
- When compared to sessions without a therapy dog:
  - Sessions with two dogs had 15% greater minutes of light PA
  - Sessions with 1 dog had 15% and 17% lower VPA and sedentary time
  - MVPA and number of impacts did not differ between sessions

Discussion

- Therapy dog assisted PA intervention was feasible, and dog-presence appeared to motivate children to attend PA sessions
- Increasing light PA and decreasing sedentary time and VPA may relate to children's interest to walk with the dogs
- Children with obesity walked a longer average period of time in the presence of the therapy dog[1]
- For PA intervention targets to increase MVPA, VPA and related impacts, children could be encouraged to run rather than walk with the therapy dog

[3] Wohlfarth et al. Front Psychol (2013)

Strengths

- The crossover design
- The distribution of sex was a representative sample
- PA outcomes and sedentary time were measured objectively by accelerometers with a validated methodology

Limitations

- Most participants were recruited from the adapted physical activity program.

Conclusion

- Therapy dog assisted PA intervention in children with ASD was feasible.
- When compared to sessions without a dog, sessions with two therapy dogs increased light PA (15 %) while sessions with one therapy dog decreased vigorous PA (15%) and sedentary time (17%).

Many thanks to:

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- University of Saskatchewan One Health Initiative
- College of Kinesiology PAAL Program
- Autism Services of Saskatoon
- Bob and Rita Mirwald for Travel Award

Methods

- Accelerometer-recorded (wGT3X-BT ActiGraph)
- We used validated cut-points in children[1-2]
  - Sedentary time (0 – 100 counts per minute, CPM)
  - Light PA (101- 2295 CPM),
  - MVPA (2296-4011 CPM)
  - VPA (≥4012 CPM)
- Impact counts defined based on resultant accelerometer peaks ≥ 3.9 g[3-4]

[1] Evenson et al. J Sports Sci (2008) [2] Trost et al. Med Sci Sports Exerc (2011) [3] Kehrig et al. Appl Physiol Nutr Metab (2018) [4] Vainionpää et al. Bone (2007)