

(様式第4号)

論文内容の要約

保健医療学研究科 博士後期課程	保健医療学専攻 作業療法学 分野	平成30年 4月 3日入学	
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論文題目	Occupational Therapy Program for Children with Autism Spectrum Disorder to Improve Trousers-wearing Motion in the Standing Position		
<p>【要約】(文章の順番を守り、論理立てて記載してください。)</p> <p>The purpose of this study was to investigate whether play-based occupational therapy improves the motions of children with autism spectrum disorder (ASD), who have difficulty putting on trousers in a standing position. The participants included 25 children comprising 16 boys and 9 girls (age range: 5 years and 3 months to 8 years and 2 months; IQ: 82–117) who were diagnosed with ASD (including pervasive developmental disorders and attention-deficit hyperactivity disorder). The intervention was conducted one-on-one between the therapist and the participant for 60 minutes. The participants performed a one-legged stand and trousers-wearing motions before and after the intervention. The analysis parameters for the task were foot pressure and center of pressure (COP) and motion analysis using video data. Each parameter of the one-legged stand showed no intervention effect. In contrast, the maximum excursion and total trajectory of COP in the anterior–posterior direction of the first support leg decreased significantly after the intervention compared to that before the intervention (<math>p=0.049</math>, <math>0.018</math>). After the intervention, the trouser-wearing motion improved by three points. The participants found it easier to maintain a forward bend of the trunk while standing on one leg. Further, the foot of the first swing leg no longer got caught in the hem of the trousers. In addition, the participants improved their grasp of the waist edge of the trousers during the trouser-wearing motion. These findings suggest that the trousers-wearing motion produced a task-specific effect.</p>			

【主な引用文献・参考文献】

1. Lord C, Elsabbagh M, Baird G, Veenstra-Vanderweele J (2018) Autism spectrum disorder. *Lancet* 392(10146):508-520.
2. Denda K (2017) Understanding individualities in autism spectrum disorder. *Jpn J Psychosom Med* 2017(57):19-26 (in Japanese).
3. American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders (DSM-5). 5th (Edn.), Washington, DC, American Psychiatric Association Publishing, pp: 429-457.
4. Miyakawa J (2014) DMS-5, revised diagnostic criteria by American Psychiatric Association: neurodevelopmental disorders, intellectual disabilities, and autism spectrum disorder. *J. Sch. Educ. Sugiyama Jogakuen Univ.* 7:65-78 (in Japanese).
5. Stein DJ, Szatmari P, Gaebel W, Berk M, Vieta E, et al. (2020) Mental, behavioral and neurodevelopmental disorders in the ICD-11: an international perspective on key changes and controversies. *BMC Med* 18(1):21.
6. Saito M, Hirota T, Sakamoto Y, Adachi M, Takahashi M, et al (2020) Prevalence and cumulative incidence of autism spectrum disorders and the patterns of co-occurring neurodevelopmental disorders in a total population sample of 5-year-old children. *Mol Autism* 11(1):35.
7. Tripi G, Roux S, Carotenuto M, Bonnet-Brilhault F, Roccella M (2018) Minor neurological dysfunctions (MNDs) in autistic children without intellectual disability. *J Clin Med* 7(4):79.
8. De Jong M, Punt M, De Groot E, Minderaa RB, Hadders-Algra M (2011) Minor neurological dysfunction in children with autism spectrum disorder. *Dev Med Child Neurol* 53(7):641-646.
9. Ament K, Mejia A, Buhlman R, Erklin S, Caffo B, et al. (2015) Evidence for specificity of motor impairments in catching and balance in children with autism. *J Autism Dev Disord* 45(3):742-751.
10. Mari M, Castiello U, Marks D, Marraffa C, Prior M (2003) The reach-to-grasp movement in children with autism spectrum disorder. *Philos Trans R Soc Lond B Biol Sci* 358(1430):393-403.
11. Nayate A, Bradshaw JL, Rinehart NJ (2005) Autism and Asperger's disorder: are they movement disorders involving the cerebellum and/or basal ganglia? *Brain Res Bull* 67(4):327-334.
12. Whitney ER, Kemper TL, Rosene DL, Bauman ML, Blatt GJ (2009) Density of cerebellar basket and stellate cells in autism: evidence for a late developmental loss of Purkinje cells. *J Neurosci Res* 87(10):2245-2254.
13. D' Mello AM, Stoodley CJ (2015) Cerebro-cerebellar circuits in autism spectrum disorder. *Front Neurosci* 9:408.
14. Kelly E, Meng F, Fujita H, Morgado F, Kazemi Y, et al. (2020) Regulation of autism-relevant behaviors by cerebellar-prefrontal cortical circuits. *Nat Neurosci* 23(9):1102-1110.

15. Dadalko O, Travers BG (2018) Evidence for brainstem contributions to autism spectrum disorders. *Front Integr Neurosci* 12:47.
16. Hanaie R, Mohri I, Kagitani-Shimono K, Tachibana M, Matsuzaki J, et al. (2016) White matter volume in the brainstem and inferior parietal lobule is related to motor performance in children with autism spectrum disorder: A voxel-based morphometry study. *Autism Res* 9(9):981-992.
17. Frazier TW, Keshavan MS, Minshew NJ, Hardan AY (2012) A two-year longitudinal MRI study of the corpus callosum in autism. *J Autism Dev Disord* 42(11):2312-2322.
18. Rinehart NJ, Tonge BJ, Bradshaw JL, Iansek R, Enticott PG, et al. (2006) Movement-related potentials in high-functioning autism and Asperger's disorder. *Dev Med Child Neurol* 48(4):272-277.
19. Fournier KA, Kimberg CI, Radonovich KJ, Tillman MD, Chow JW, et al. (2010) Decreased static and dynamic postural control in children with autism spectrum disorders. *Gait Posture* 32(1):6-9.
20. Fournier KA, Shinichi Amano, Radonovich KJ, Bleser TM, Hass CJ (2014) Decreased dynamical complexity during quiet stance in children with autism spectrum disorders. *Gait Posture* 39(1):420-3.
21. Minshew NJ, Sung KB, Jones BL, Furman JM (2004) Underdevelopment of the postural control system in autism. *Neurology* 63(11):2056-2061.
22. Cheldavi H, Shakerian S, Boshehri NS, Zarghami M (2014) The effects of balance training intervention on postural control of children with autism spectrum disorder: Role of sensory information. *Res Autism Spectr Disord* 8(1):8-14.
23. Casey AF, Quenneville-Himbeault G, Normore A, Davis H, Martell SG (2015) A therapeutic skating intervention for children with autism spectrum disorder. *Pediatr Phys Ther* 27(2):170-177.
24. Nuntanee S, Daranee S (2019) Effect of motorized elephant-assisted therapy program on balance control of children with autism spectrum disorder. *Occup Ther Int* 2019:5914807.
25. Hassani F, Shahrbanian S, Shahidi SH, Sheikh M (2020) Playing games can improve physical performance in children with autism. *Int J Dev Disabil* 11:1-8.
26. Provost B, Crowe TK, Osbourn PL, McClain C, Skipper BJ (2010) Mealtime behaviors of preschool children: comparison of children with autism spectrum disorder and children with typical development. *Phys Occup Ther Pediatr* 30(3):220-233.
27. Nadon G, Feldman DE, Dunn W, Gisel E (2011) Association of sensory processing and eating problems in children with autism spectrum disorders. *Autism Res Treat* 2011:541926.
28. Chi IJ, Lin LY. Exploring the performance of self-care and visual perception in preschool children with autism spectrum disorder (ASD). *Am J Occup Ther* 2020;74(4\_Supplement\_1): 7411505164p1-7411505164p1.
29. Boop C, Cahill SM, Davis C, Dorsey J, Gibbs V, et al. (2020) Occupational therapy practice framework: Domain and process fourth edition. *Am J Occup Ther* 74(S2):1-85.

30. Tomchek SD, Dunn W (2007) Sensory processing in children with and without autism: a comparative study using the short sensory profile. *Am J Occup Ther* 61(2):190-200.
31. Tani I, Ito H, Hirashima T, Iwanaga R, Hagiwara T, et al (2015) Standardization of the Japanese Version of the Short Sensory Profile: reliability and validity. *Clin Psychiatry* 57(6):419-429 (in Japanese).
32. Fidler GS, Velde BP (1999) *Activities: reality and symbol*. 1st (Edn.), Slack Incorporated, West Deptford, New Jersey, USA, pp: 61-79.
33. Tickle-Degnen L, Coster W (1995) Therapeutic interaction and the management of challenge during the beginning minutes of sensory integration treatment. *OTJR Occup Particip Health* 15(2):122-141.
34. Dunkerley E, Tickle-Degnen L, Coster WJ (1997) Therapist-child interaction in the middle minutes of sensory integration treatment. *Am J Occup Ther* 51(10):799-805.
35. Pfeiffer BA, Koenig K, Kinnealey M, Sheppard M, Henderson L (2011) Effectiveness of sensory integration interventions in children with autism spectrum disorders: a pilot study. *Am J Occup Ther* 65(1):76-85.
36. Matsuda N, Kato K, Ito K, Morikawa A, Suzuki K, et al. (2021). Differences in the motion of typically developing children aged 4-6 years, putting on trousers in a standing position. *Yamagata J Health Sci*. 25. On-Line First.
37. Gurfinkel V, Cacciatore TW, Cordo P, Horak F, Nutt J, et al. (2006) Postural muscle tone in the body axis of healthy humans. *J Neurophysiol* 96(5):2678-2687.
38. Paquet Aude, Olliac B, Golse B, Vaivre-Douret L (2017) Evaluation of neuromuscular tone phenotypes in children with autism spectrum disorder: an exploratory study. *Neurophysiol Clin* 47(4):261-268.
39. Serdarevic F, Ghassabian A, van Batenburg-Eddes T, White T, Blanken LME, et al. (2017) Infant muscle tone and childhood autistic traits: A longitudinal study in the general population. *Autism Res* 10(5):757-768.
40. Graham SA, Abbott AE, Nair A, Lincoln AJ, Müller RA, et al. (2015) The influence of task difficulty and participant age on balance control in ASD. *J Autism Dev Disord* 45(5):1419-1427.
41. Zumbunn T, MacWilliams BA, Johnson BA (2011) Evaluation of a single leg stance balance test in children. *Gait Posture* 34(2):174-177.
42. Ayres AJ (1985) *Southern California sensory integration tests manual*. Los Angeles, Western Psychological Services.
43. Adrien JL, Lenoir P, Martineau J, Perrot A, Hameury L, et al. (1993) Blind ratings of early symptoms of autism based upon family home movies. *J Am Acad Child Adolesc Psychiatry* 32(3):617-626.
44. Adrien JL, Ornitz E, Barthelemy C, Sauvage D, Lelord G (1987) The presence or absence of certain behaviors associated with infantile autism in severely retarded autistic and nonautistic retarded children and very young normal children. *J Autism Dev Disord* 17(3):407-416.

45. Baranek GT (1999) Autism during infancy: a retrospective video analysis of sensory-motor and social behaviors at 9-12 months of age. *J Autism Dev Disord* 29(3):213-224.
46. Kientz MA, Dunn W (1997) A comparison of the performance of children with and without autism on the Sensory Profile. *Am J Occup Ther* 51(7):530-537.
47. Ornitz EM, Lane SJ, Sugiyama T, de Traversay J (1993) Startle modulation studies in autism. *J Autism Dev Disord* 23(4):619-637.
48. Osterling J, Dawson G (1994) Early recognition of children with autism: a study of first birthday home videotapes. *J Autism Dev Disord* 24(3):247-257.
49. Molloy CA, Dietrich KN, Bhattacharya A (2003) Postural stability in children with autism spectrum disorder. *J Autism Dev Disord* 33(6):643-652.
50. Gabis LV, Shaham M, Leon Attia O, Shefer S, Rosenan R, et al. (2021) The Weak Link: Hypotonia in Infancy and Autism Early Identification. *Front Neurol* 12:612674.
51. Smoot Reinert SS, Jackson K, Bigelow K (2015) Using posturography to examine the immediate effects of vestibular therapy for children with autism spectrum disorders: A feasibility study. *Phys Occup Ther Pediatr* 35(4):365-380.