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Online Journal Club – Article Review

Background/Overview	
Article Citation	Ilg W, Synofzik M, Brötz D, Burkard S, Giese M, Schöls L. Intensive coordinative training improves motor performance in degenerative cerebellar disease. <i>Neurology</i> . December 1, 2009;73(22):1823-1830.
Study Objective/Purpose (hypothesis)	The authors examined whether patients with cerebella ataxia can improve interjoint coordination and dynamic balance by intensive coordination training over period of 4 weeks.
Methods	
Study Design	Prospective, cohort study. To control for variability of disease progression, patients were taken as their own controls in an intra-individual control design where performance chances with and without training were compared.
Target Population	16 patients with progressive ataxia due to cerebellar degeneration (n = 10) or degeneration of afferent pathways (n = 6).
Interventions (if applicable):	The physiotherapy program consisted of a 4-week course of intensive training with 3 sessions of 1 hour per week. Exercises included the following categories: 1) static balance, e.g., standing on 1 leg; 2) dynamic balance, e.g., sidesteps, climbing stairs; 3) whole-body movements to train trunk-limb coordination; 4) steps to prevent falling and falling strategies; 5) movements to treat or prevent contracture. A home exercise program was issued to participants after the 4 weeks of training were completed.

Outcome Measures	<ul style="list-style-type: none"> - SARA (Scale for the Assessment and Rating of Ataxia) - ICARS (International Cooperative Ataxia Rating Scale) - BBS (Berg Balance Scale) - Improvements in personally relevant activities of daily living assessed by an individual goal attainment score (GAS) - Standard gait measures such as velocity, step length, step width, lateral body sway, and vbT. (<i>vbT</i> is a specific measure for temporal variability of intralimb coordination. Abnormalities in this coordination has shown in previous studies to be specific with cerebellar dysfunction.) - Static balance task (stand for 30 second with eyes open, feet together and arms in front of the body) - Dynamic balance task (reactive postural control to treadmill moving) <p>*Outcomes were assessed at four different time points in the study: 8 weeks prior to intervention; at start of coordinative training intervention; after the last coordinative training intervention session; and at 8 weeks follow-up</p>
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Results

Summary of Primary and Secondary Outcomes: note results that were statistically significant	<ul style="list-style-type: none"> - SARA, ICARS and Berg Balance Scale – “significant improvement” in cerebellar and afferent groups for pre/post intervention, however significant retention restricted to the cerebellar group only. The reported change pre to post-intervention on the SARA was an average of 5 points. Though reported to be significant, no MCID has been found with the SARA, and no specific numbers were reported for the ICARS and Berg Balance Scale were given. - GAS – cerebellar patients benefitted more than afferent patients. Average rating was 0.5 (0 = expected outcome and 1= great than expected outcome). For the cerebellar group, average rating was 0.8 compared to the afferent ataxia group, which was 0.1. - Gait analysis – increased velocity for cerebellar patients in the comparison of pre/post intervention and retention. In contrast, velocity was not increased for the afferent group. Consistent with these results, cerebellar patients showed persistent increase in step length and a decrease in lateral body sway, indicating improvement in dynamic balance in gait. Patients with afferent ataxia were not able to reduce body sway after training.
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Authors’ Conclusions

Authors' Conclusion	In patients with degenerative cerebellar ataxia, coordinative training improves motor performance and reduces ataxia symptoms, enabling them to achieve personally meaningful goals in everyday life. Training effects were more distinct for patients whose afferent pathways were not affected. For both groups, continuous training seems crucial for stabilizing improvements and should become standard of care.
Reviewer's Discussion and Conclusion	
Study Strengths	<p>To control for variability in disease progression, patients were taken as their own controls in an intra-individual control design where performance changes with and without training were compared (level of evidence Class III).</p> <p>The intervention protocol design was based on functional activities such as dynamic balance, reactive balance, dynamic standing, etc. which is applicable to every day lfe/function.</p>
Study Limitations and Potential for Bias	<ul style="list-style-type: none"> - Small sample size - Sample was only those with degenerative cerebellar conditions (ex.- Cerebellar strokes note included) - Focus is on ambulatory patients – may not be applicable to patients with lower functional level - Cohort study in which subjects served as their own controls - Outcome measures: there are limited psychometrics on this as a primary outcome measure (ie. no MCID or norms). - Although the research focused on gait quality during their thorough gait analysis, no attention was given to functional ambulation outcome measures, such as the FGA or DGI, to gain insight into any changes in functional improvements in gait. - A report was given for several outcome measures as a “significant change” was given, but no actual data was shared in the report. This was specifically noted with the Berg Balance Scale and ICARS. With no specific data given, it is difficult to determine if the change is statistically significant, and more importantly clinically significant.

<p>Applicability:</p> <ul style="list-style-type: none"> • Types of patients (dx) that results apply to • Types of settings or patient acuity that the results apply to • Can interventions be reproduced? Can results be applied to other pt populations? 	<p>The focus is on ambulatory patients, who were able to walk with or without walking aid, indicating that patients with more severe impairments may not be able to perform most of the exercises suggested in this study. Therefore, the population that this study is most applicable for is community dwelling adults, who were able to ambulate community distances with/without an assistive device, not lower functioning subject requiring increased physical assist with mobility. The study also looked at patients with progressive ataxia due to cerebellar degeneration as well as degeneration, of afferent pathways—thus these results may not be applicable to patients with stable neurologic conditions affecting the cerebellum, such as cerebellar stroke. Interventions can be produced – descriptions of physiotherapeutic interventions utilized in this study are distributed via article.</p>
<p>How will study results impact PT management of this patient population?; List suggestions for how to implement changes in your clinic/department to integrate study findings into patient care</p>	<p>This article investigated an exercise program that can be used as framework for interventions with patients with cerebellar ataxia. After reading this article, we hope to facilitate discussion among our respective facilities through an in-service to educate all to see the benefits of these exercises.</p> <ul style="list-style-type: none"> • The importance of an HEP was emphasized to maintain results, especially including exercises that emphasize not only extremity movements, but whole body balance. This is because the improvements that were maintained at follow-up for subjects were specific to the tasks that were performed (ie. they were maintained with HEP activities but not with reactive balance ability that had been attained through treadmill exercises.