

Woodcock Research Grant Final Report

Project Title: Fall Risk and Quality of Life: Influence of Dual Task Performance, Cognition and Sensorimotor Variables in Individuals with Cancer Treatment Related Peripheral Neuropathy

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The grant was awarded in November 2023, with a funding period of 11/01/2023–06/30/2025. IRB approval was received on February 22, 2024. On June 3, 2025, a no-cost extension was approved, extending the project period through June 30, 2026.

Overview of the project: The goal of the project was to evaluate the dual task cost of walking in forward and backward directions and to explore what motor, sensory and cognitive impairments will predict fall risk and will correlate with quality of life in individuals with cancer treatment induced peripheral neuropathy with non-CNS cancers compared to age and gender matched controls without neuropathy.

Project Progress

Participant recruitment and data collection were completed for 40 participants (20 experimental, 20 control). Data analysis is currently underway, examining dual-task cost and related outcomes between groups. Seven DPT students were hired (paid hourly) to assist with recruitment, data collection, and analysis; students also received course credit for participation. Manuscripts reporting study results are planned for submission in Fall 2026 and Spring 2027.

Preliminary findings were presented at APTA CSM 2025 and 2026, and DPT student research assistants presented findings at the TWU School of Physical Therapy Research Conference in 2024 and 2025:

1. Karakkattil, P., Ravindranath, H., Ast, L., Prentice, L., & Vas, A. (2025, February). Gait variability during single and dual task walking in individuals with cancer treatment related neuropathy. Platform presentation at the APTA Combined Sections Meeting, Houston, TX.
2. Karakkattil, P., Ravindranath, H., Hossain, M., Deggs, J., Sathianathan, M., Chiasson, K., Crompton, E., & Vas, A. (2026, February). Effects of chemotherapy-induced peripheral neuropathy on sensorimotor mobility, cognition, and falls compared to matched controls. Platform presentation at the APTA Combined Sections Meeting, Anaheim, CA.
3. Smith, J. A., Jones, M. R., Brown, T. L., & Karakkattil, P. (2024, December). Dual-task gait performance in individuals with chemotherapy-induced peripheral neuropathy. Platform presentation at the TWU School of Physical Therapy Research Conference, Dallas, TX.
4. Chiasson, K., Deggs, J., Hossain, M., Sathianathan, M., & Karakkattil, P. (2025, December). The impact of chemotherapy-induced peripheral neuropathy on motor, cognitive, and dual-task walking performance in non-CNS cancer survivors. Platform presentation at the TWU School of Physical Therapy Research Conference, Dallas, TX.

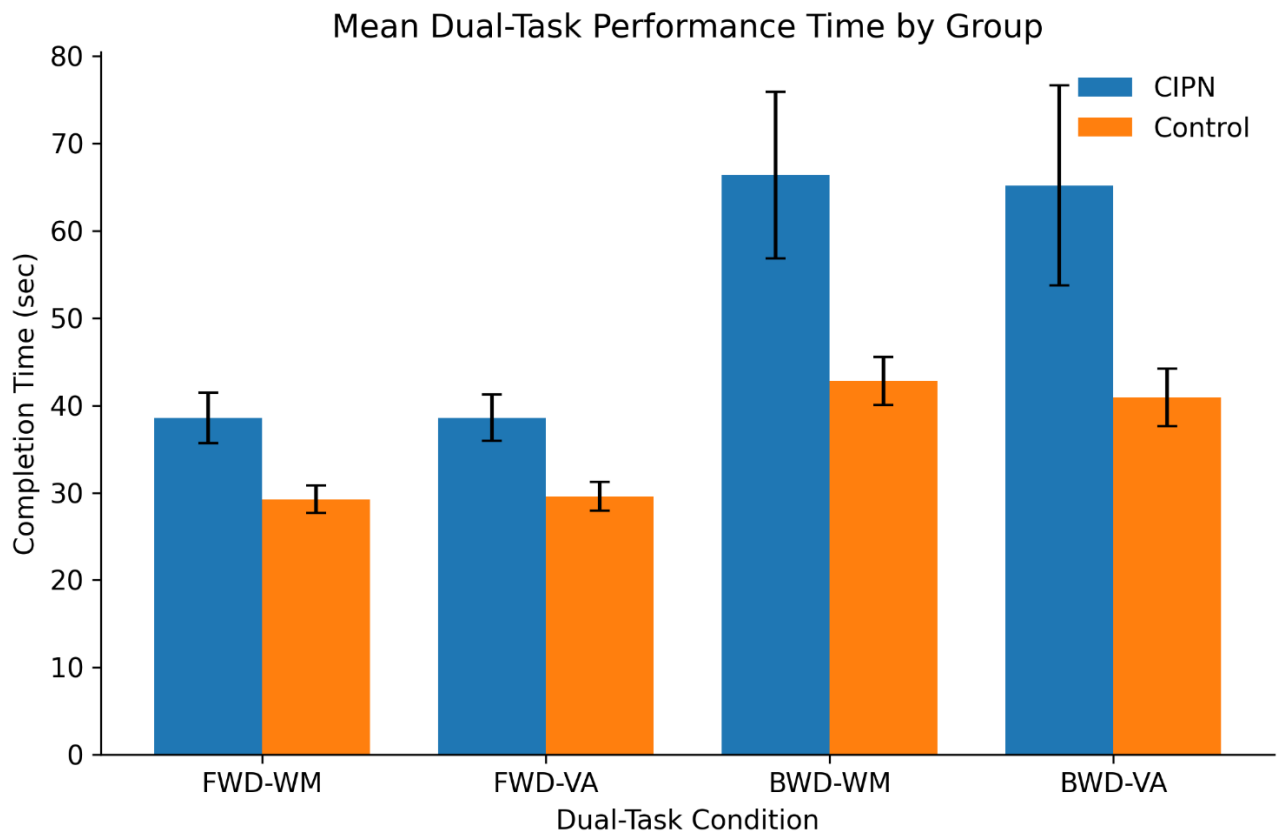
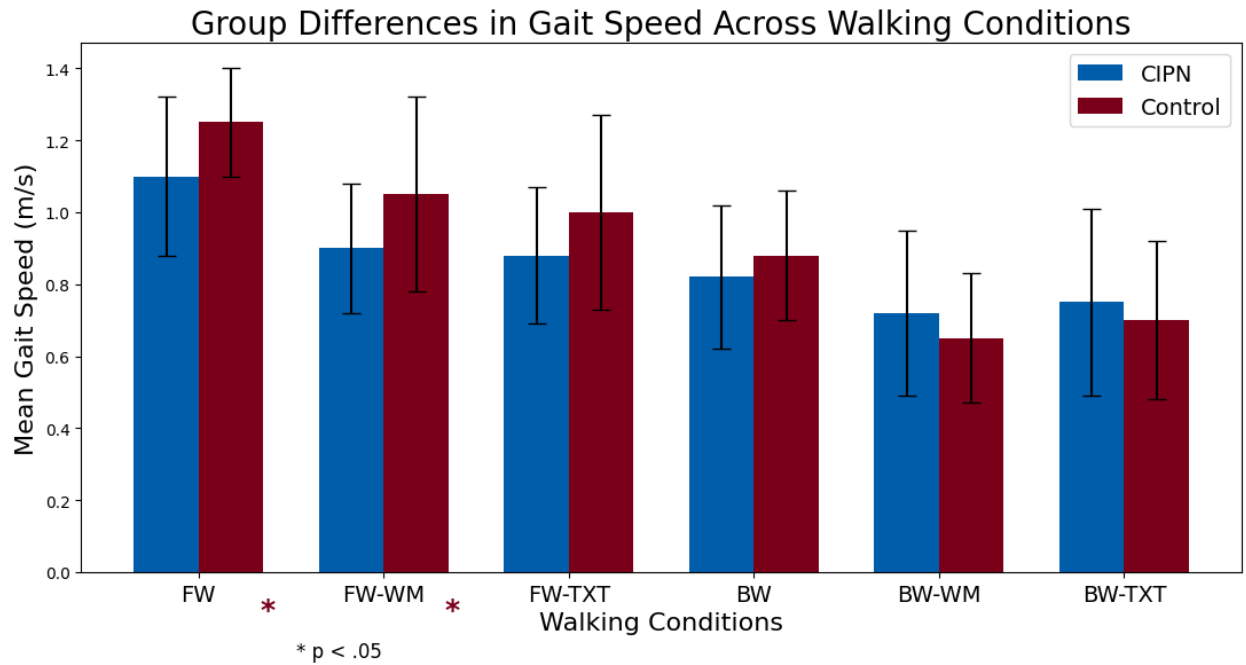
Key Results:

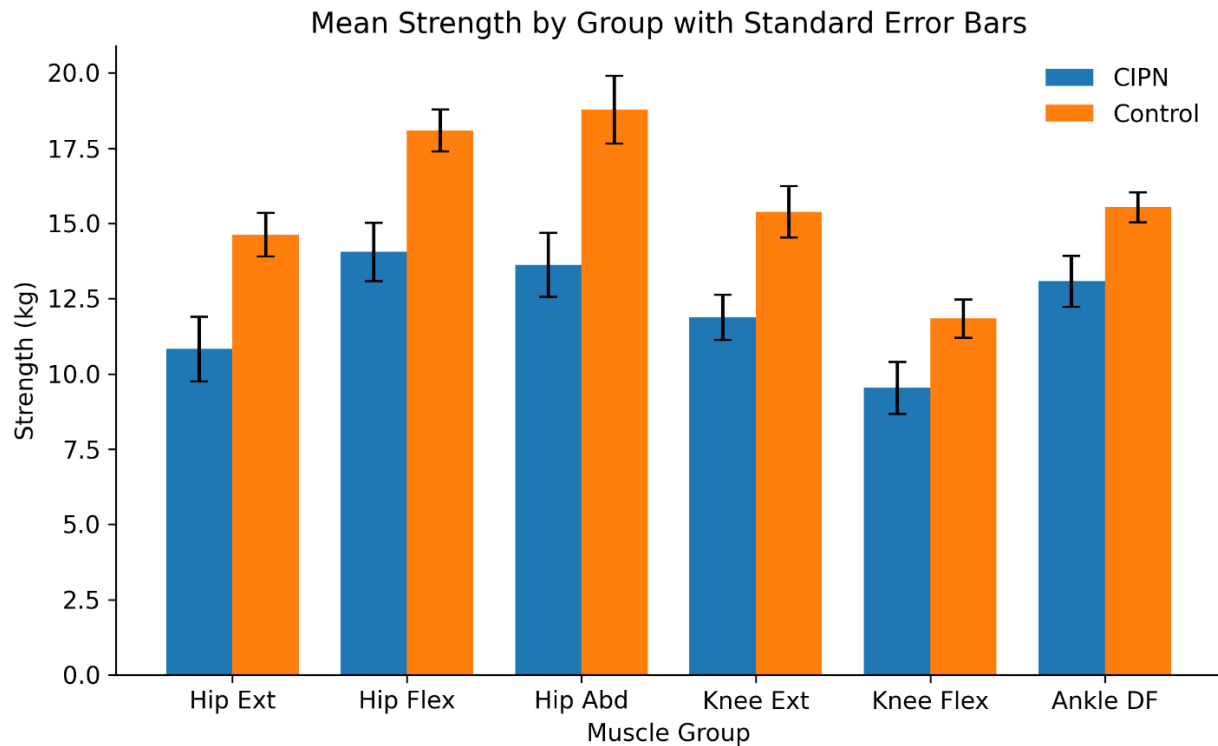
No significant between-group differences were found in single-task cognitive function ($p > .05$). Individuals with CIPN demonstrated significantly higher incidence of falls compared to controls ($p = .002$), lower grip strength (dominant: $p = .05$; non-dominant: $p = .012$), poorer NHPT scores (dominant: $p = .002$; non-dominant: $p = .06$), slower TUG ($p < .001$), and slower 4SST performance ($p < .001$). All lower extremity strength measures were significantly lower in the CIPN group ($p < .05$).

Regarding dual-task performance, no significant between-group differences were observed in dual-task cost (DTC) across gait measures ($p > .05$). However, gait speed in the forward direction during a working memory task was significantly reduced in individuals with CIPN ($p = .016$).

When examining cognitive performance, no significant differences were observed between the CIPN and control groups on total responses or correct responses during either forward- or backward-walking dual-task conditions (working memory and texting tasks; $p > .05$). However, significant group differences were found for task completion times across both forward- and backward-walking dual-task conditions ($p < .05$). These findings suggest that while cognitive accuracy may be preserved in individuals with CIPN, the speed at which information is processed, and responses are executed may be impaired. Significant differences among gait, cognition, and strength variables are graphed below.

Logistic regression analyses were conducted to identify factors associated with fall history. Models including forward- and backward-walking gait speed, dual-task cost, cognitive dual-task completion times, and lower-extremity strength measures (knee extension, knee flexion, and ankle dorsiflexion strength) were not significant predictors of fall status ($p > .05$). In contrast, the model incorporating hip strength variables (hip extension, hip flexion, and hip abduction strength) significantly distinguished fallers from non-fallers ($p < .05$). Group membership (CIPN vs. control) also significantly predicted fall status ($p < .05$), although the effect size was slightly smaller than that observed for the hip strength model (Nagelkerke's R^2 value of .31 vs. .35) indicating that both hip strength and CIPN status accounted for a meaningful proportion of the variance in fall history.





Budgetary Expenditure:

A total of \$13,689.11 was expended as follows: \$8,063.00 on summer salary and fringe for the PI (0.28 FTE, 2024); \$4,000.00 on participant incentives; \$1,200.00 on consultant fees; and \$426.11 on research assistant hourly wages. The current balance is \$1,310.89.

The budget variance in personnel costs reflects student availability constraints during the project period. Graduate student support was budgeted at \$1,185.00; however, only \$426.11 was expended in hourly wages, as a portion of the student contribution was fulfilled through course credit rather than paid compensation.