Ultrasound Therapy for Chemotherapy Induced Peripheral Neuropathy in Colon and Colorectal Cancer Patients: A Pilot Randomized Controlled Trial

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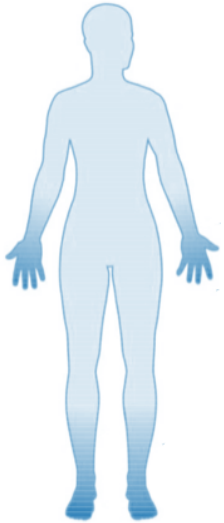


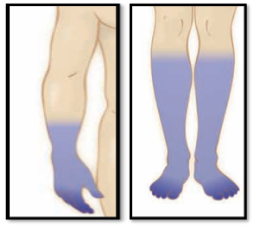
BACKGROUND

Chemotherapeutic agents used in the treatment of cancer

Toxic neuropathy affecting the peripheral nervous system

Chemotherapy Induced Peripheral Neuropathy (CIPN)

Sensory symptoms (Tingling, burning, numbness, Reduced sensation, ataxia and falls)



Functional difficulties and Increased risk of falls

What are the available management options?

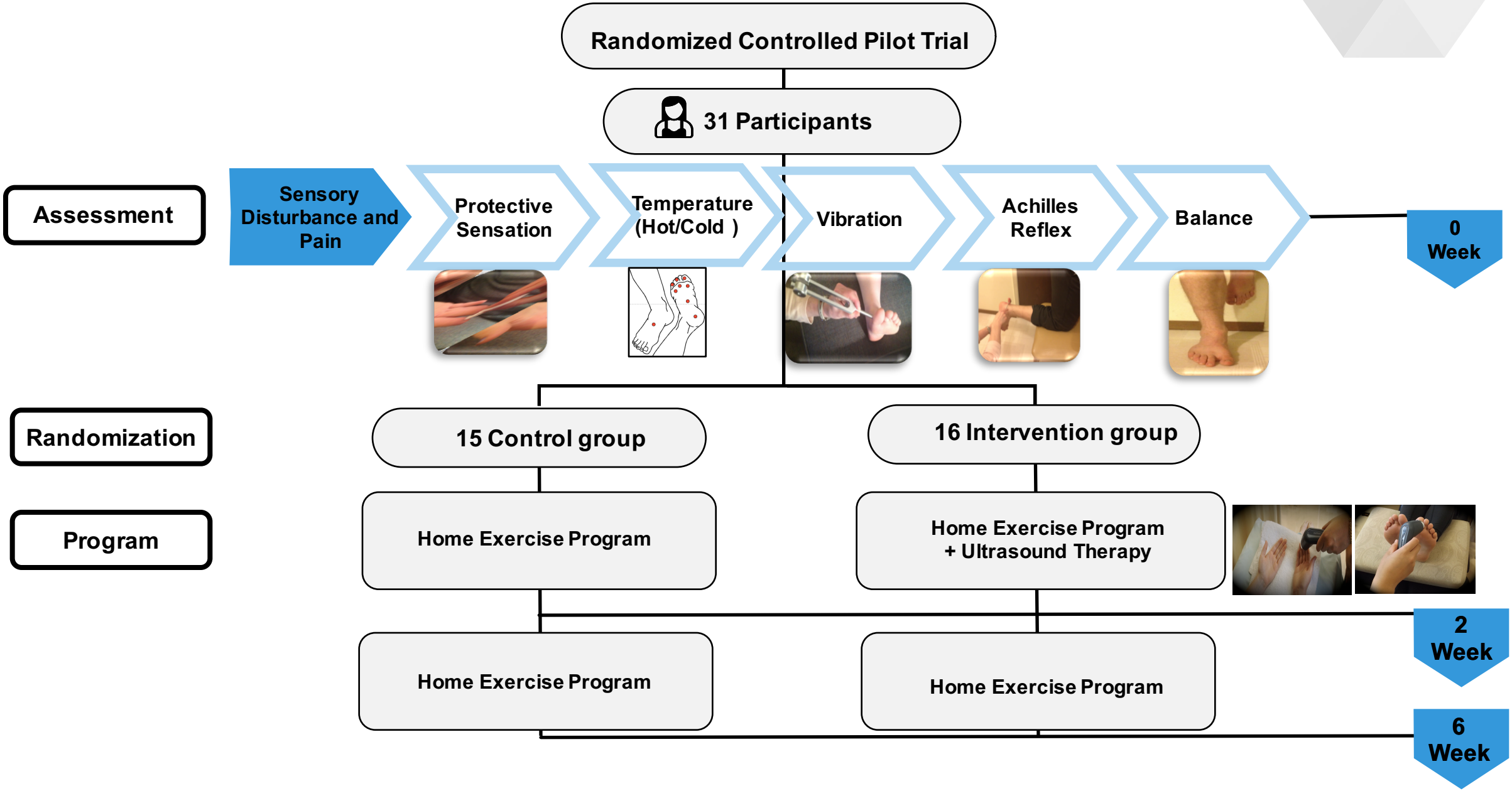
- **Exercise**
- **Balance training**
- **Electrophysical modalities**
- **Acupuncture**

- **In cancer clinical settings**, ultrasound therapy used to address **pain** and other **sensory symptoms**
- **No clinical research studies** have been performed examining its efficacy in any patient population with **CIPN**

Study Objectives:

- **To determine the preliminary efficacy of adding therapeutic ultrasound to current standard of care for patients with CIPN**
- **To determine the point estimates and measures of variability for CIPN-related pain and sensory disturbance**

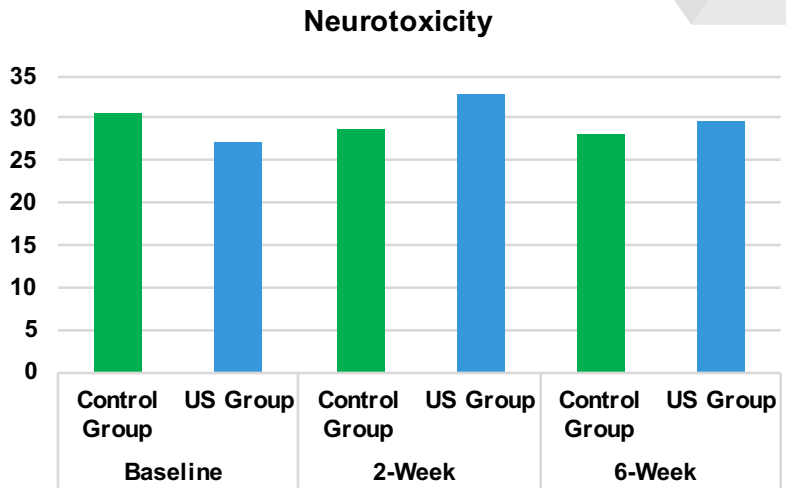
METHODS

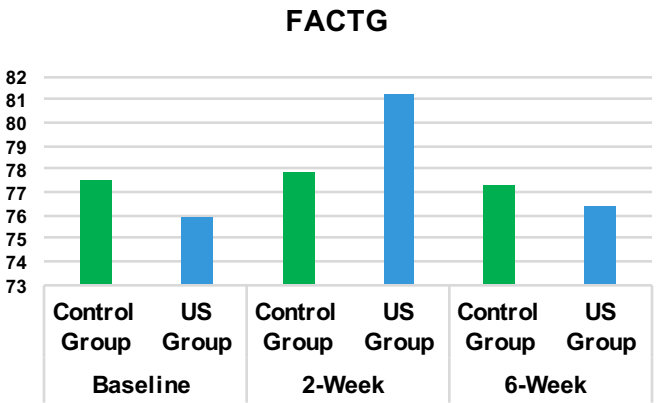

Randomized Controlled Pilot Trial
31 Participants
Assessment
Sensory Disturbance and Pain
Protective Sensation
Temperature (Hot/Cold)
Vibration
Achilles Reflex
Balance
0 Week
Randomization
15 Control group
16 Intervention group
Program
Home Exercise Program
Home Exercise Program + Ultrasound Therapy
2 Week
Home Exercise Program
Home Exercise Program
6 Week

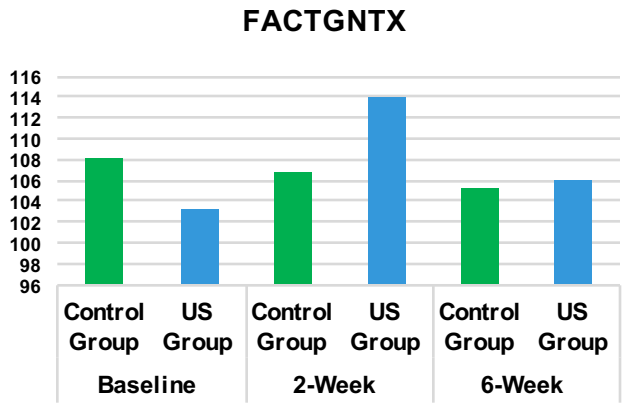
RESULTS

	Change: Baseline-2 week			Change: Baseline-6 week		
	Control Group	US Group	P	Control Group	US Group	P
	Mean (SD	Mean (SD		Mean (SD	Mean (SD	
FACTG	.33 (6.56)	5.38 (8.41)	0.09	-.27 (8.51)	.50 (12.27)	0.80
Neurotoxicity	-1.67 (4.13)	5.69 (7.70)	0.003	-2.47 (7.20)	2.69 (8.33)	0.14
FACTGNTX	-1.33 (7.93)	10.75 (12.93)	0.012	-2.73 (12.80)	2.88 (17.70)	0.29
QLQ Percentage	1.15 (10.53)	-1.17 (9.97)	0.83	-.32 (16.48)	3.13 (12.29)	0.54
Protective	2.00 (4.17)	2.13 (2.81)	0.98	2.57 (4.17)	3.84 (4.78	0.74
Temperature	.79 (2.61)	2.16 (3.31)	0.34	2.04 (4.06)	2.78 (2.79	0.53
Vibration (Fingers)	-.20 (.56)	.31 (.70)	0.03	.20 (1.42)	.75 (1.95)	0.21
Balance	.54 (3.31)	1.88 (7.50)	1.0	2.51 (6.55)	0.56 (2.25)	0.30

Primary outcomes







CONCLUSION

- CIPN associated with a broad range of effects to sensory, motor and autonomic systems that affect survivors quality of life
- Adding therapeutic ultrasound to standard care resulted in a **statistical significant improvement** in self-reported symptoms of **pain and sensory disturbance** (**$p < 0.003$**)
- The improvement was **more than double** the minimal clinically important difference (**10.75 points**)
- No significant differences were found at 6 weeks ($p > 0.05$)
- No significant differences were found in other outcomes with the exception of distal vibration sensation ($p = 0.03$)

Study Limitations:

- Small sample size
- Absence of placebo control group

Future Research

- **A large scale placebo-controlled** randomized study is needed to examine the efficacy of therapeutic ultrasound for patients with CIPN