

SAFETY, EFFICACY AND USABILITY OF THE PAXMAN LIMB CRYOCOMPRESSSION SYSTEM FOR PREVENTION OF CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY

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INTRODUCTION

- Cryotherapy is a promising intervention for preventing chemotherapy-induced peripheral neuropathy (CIPN). [1]
- Current methods of delivering hypothermia have limited efficacy. [2]
- The **Paxman Limb Cryocompression System (PLCS)** was developed for use in chemotherapy suites to prevent CIPN (Fig. 1).
- We report the *safety, tolerability, efficacy* and various *usability* aspects of the PLCS in delivering cryocompression.



Fig 1. Components of the PLCS

METHOD

- Optimal PLCS parameters were determined in a previous healthy volunteer study. [3]
- 15 breast cancer patients** receiving weekly paclitaxel chemotherapy underwent concomitant limb cryocompression for 12 weeks (Fig. 2).

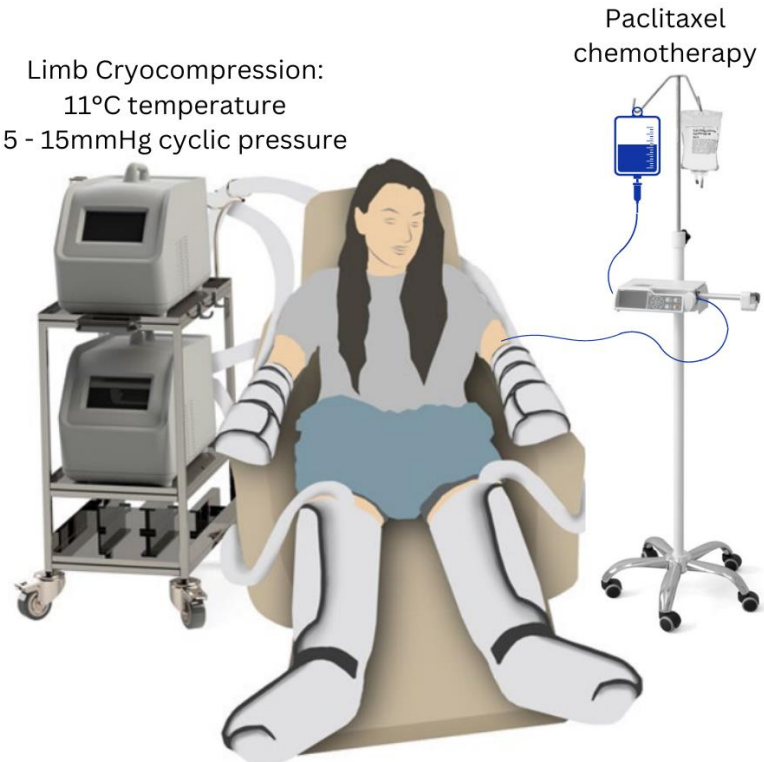


Fig 2. The PLCS setup during the trial

- Safety** was evaluated with cryotherapy-related adverse events.
- Tolerability** was measured using a Visual Analogue Pain Scale.
- Efficacy** was evaluated using the EORTC Quality of Life Questionnaire-CIPN20.
- Skin surface temperatures were recorded to evaluate cooling efficiency.
- Usability** questionnaires were used to assess design and user experience.

RESULTS

- 14 out of 15 cancer patients** completed 12 cycles of cryocompression.
 - 1 patient completed 11 cycles due to other medical reasons not related to cryocompression tolerance.
- 83.8%** of the cryocompression sessions were maintained at optimal temperature (11°C) or below.
- No core hypothermia** or paclitaxel dose reductions due to CIPN.
- Mean difference** in CIPN20 sensory neuropathy scores: 1.2
 - 2 patients (13%) developed clinically meaningful CIPN (Fig. 3).
- Average **skin temperature** drop (Fig. 4):
 - 11.53 ± 4.63°C (Arms), 10.80 ± 1.47°C (Legs)

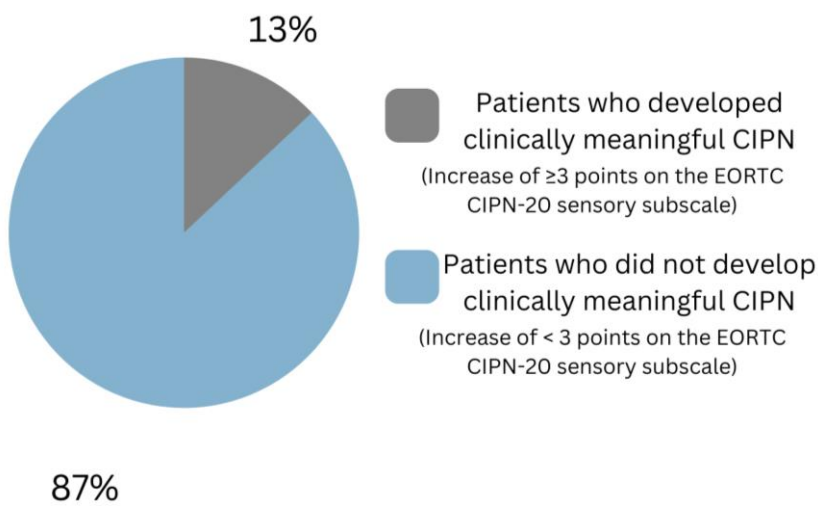


Fig 3. Efficacy of the PLCS in preventing the onset of CIPN

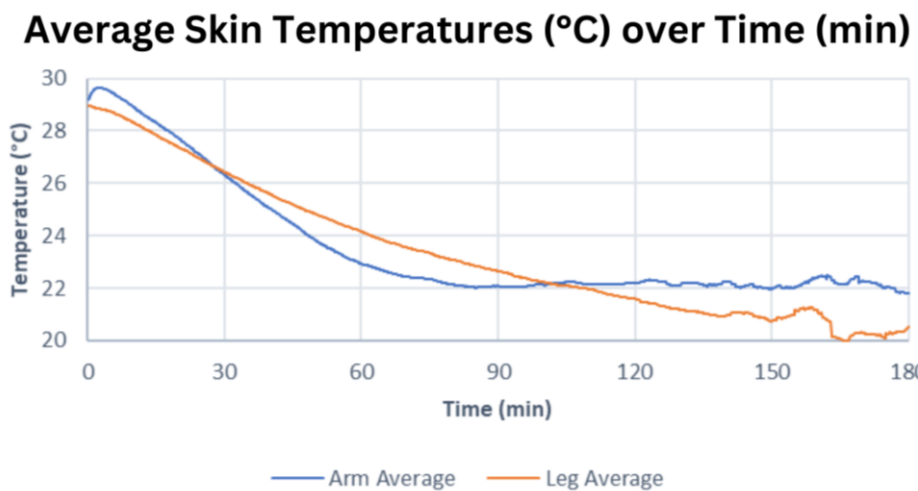


Fig 4. Skin temperature profiles over the 3h cryocompression session

- Feedback on **comfort and usability** of the PLCS (Fig. 5).

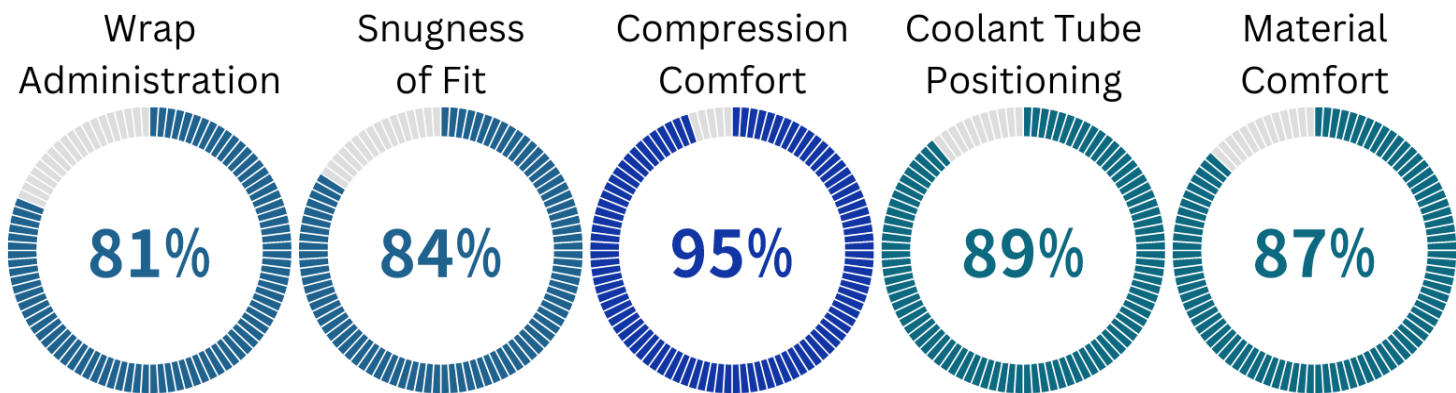


Fig 5. Feedback on Design and User Satisfaction

CONCLUSION

- The PLCS delivers *safe, tolerable and effective* cryocompression to prevent CIPN.
- Feedback from various stakeholders used to improve PLCS design (Fig. 6, 7, 8).
- Continuing to recruit 80 cancer patients in Singapore.
- National Cancer Institute (US) running a three-armed randomized study with 777 cancer patients.



Fig 6. Feedback collected from various stakeholders who have interacted with the PLCS in different settings

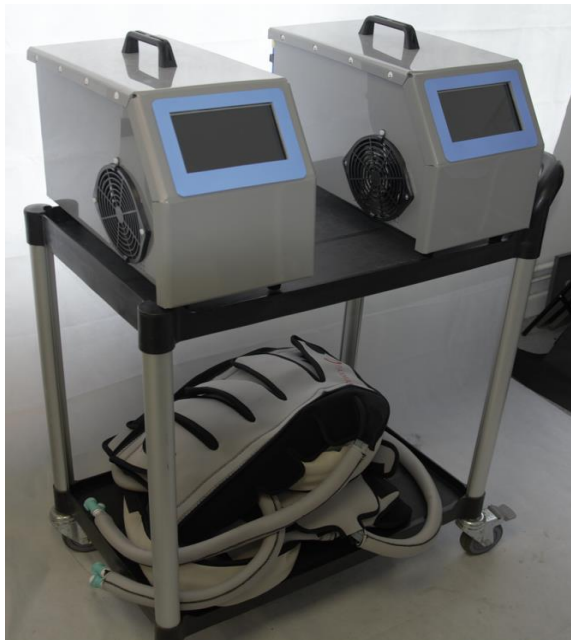


Fig 7. Initial PLCS design



Fig 8. Improved PLCS design

REFERENCES

- [1] Bandla. A et al., *Support Care Cancer.*, 2019
[2] Binder. J et al., *Front. Digit. Health.*, 2020
[3] Bandla. A et al., *MASCC*, 2022

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