Clinical Safety & Quality Service II

Pilot Physiotherapy Exercise Program for Chemotherapy-Induced Peripheral Neuropathy (CIPN) in Patients with Nasopharyngeal Carcinoma

HA Convention 2026 | Oral Presentation

Dr. Ken LEE, Advanced Practice Physiotherapist

AH – Physiotherapy, Tuen Mun Hospital, NTWC

Background: Why CIPN Matters?

Most Prevalent neurological complication of chemotherapy (50–90% affected)
NPC Patients (Gemcitabine-Cisplatin + CRT): Historical incidence up to **81.7%** (Zhang et al., 2025)

Symmetric "Stocking & Glove" distribution: Affects sensory, motor & autonomic nerves

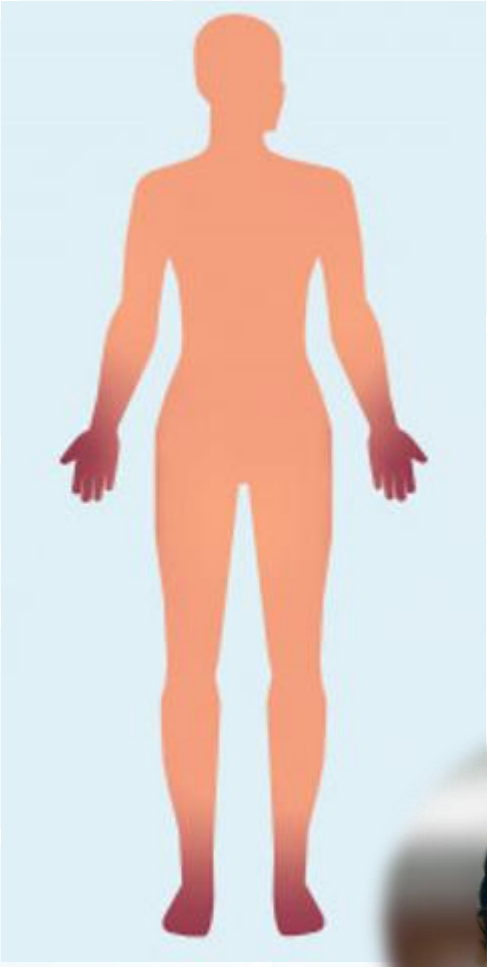
Long-term Impact: 30% experience symptoms ≥1 year post-treatment

Clinical Consequence: Dose reductions, delays, or discontinuation of chemotherapy leading to compromising outcomes

Limited Treatment: Duloxetine is the ONLY ASCO-recommended agent

Solution: Non-pharmacological exercise intervention is a promising strategy

CIPN Distribution Pattern



Affected Areas

Clinical Context at Tuen Mun Hospital

Setting: Integrated Chemotherapy and Day Care Centre serving locoregionally advanced NPC patients

Treatment Regimen: Gemcitabine + Cisplatin induction chemotherapy → Concurrent Chemoradiotherapy (CRT)

Growing Burden: Increasing cancer survivorship leads to higher prevalence of long-term CIPN complications

Identified Gap: No structured physiotherapy program existed for CIPN prevention or management

Opportunity: Physiotherapy can address CIPN through tailored exercise and patient empowerment

Target Population

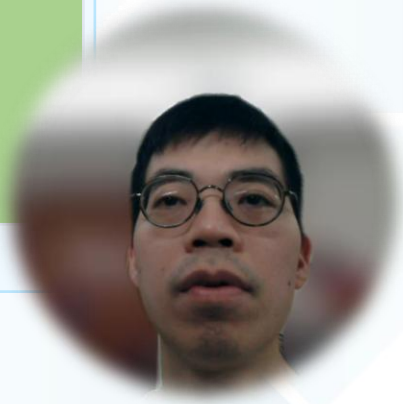
Locoregionally Advanced NPC Patients

The Challenge

Unmet need for non-pharmacological CIPN management

The Solution

Structured Physiotherapy Exercise Program



Study Objectives

1. Feasibility

Evaluate the feasibility of a tailored physiotherapy exercise program for CIPN in NPC patients.

2. Preliminary Efficacy

- Reducing CIPN incidence and severity
- Maintaining physical function (strength & tolerance)
- Preserving quality of life (QOL)
- Preventing chemotherapy dose modifications

3. Patient Satisfaction

Evaluate acceptance of the hybrid delivery model (face-to-face + telehealth).

Primary Goal

TARGETING BETTER OUTCOMES

Methodology: Study Design & Participants

Design: Prospective pilot study

Diagnosis: Locoregionally advanced Nasopharyngeal Carcinoma (NPC)

Treatment Regimen:

- Gemcitabine-Cisplatin induction chemotherapy
- Concurrent Chemoradiotherapy (CRT)

Inclusion Criteria:

- Age 18–75 years
- Histologically confirmed NPC
- No prior peripheral neuropathy

Completion Rate: 12 of 22 patients (54.5%) completed full post-treatment assessment

Cohort Overview

N = 22
Total Enrolled

19 M / 3 F
Gender Distribution

52.2 ± 10.4
Mean Age (Years)

Completion Rate

Methodology: 6-Phase Patient Journey (7 Sessions)

Phase 1: Before Chemo
Face-to-Face Assessment
- Baseline measurements
- Education & Empowerment
- Exercise prescription

Phase 2: During Chemo
Telehealth (Cycles 1-3)
- Monitoring & Progression
- CIPN symptom check
- Fatigue management

Phase 3: Before CRT
Face-to-Face Review
- Re-assessment
- Exercise adjustment
- Preparation for CRT

Phase 4: During CRT
Telehealth Support
- Fibrosis management
- Flexibility exercises
- Motivation support

Phase 5: After CRT
Face-to-Face Rehab
- Re-assessment
- Active rehabilitation
- Return to function

Phase 6: Follow-up
6 & 12 Months Post-CRT
- Long-term monitoring
- Outcome measurement
- Survivorship care

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Patient Empowerment Package
Pedometer | Two point discriminator | Logbook | Theraband | Pamphlet

Methodology: Tailored Exercise Prescription

Aerobic Exercise

- **Modality:** Walking or Brisk Walking
- **Intensity:** 60–85% Heart Rate Reserve (HRR)
- **Adjustment:** Intensity modulated based on chemotherapy fatigue cycles

Pedometer

Two point discriminator

Elastic Band

Exercise log book

Flexibility & Nerve Gliding

- **Neurodynamics:** Specific nerve gliding exercises to maintain nerve mobility
- **Management:** Stretching for post-radiation fibrosis (neck/shoulder)

Reciprocal Pulley

Exercise Pamphlet

Balance Training

- **Progression:** Static → Dynamic balance tasks
- **Target:** Addresses CIPN-related proprioceptive loss & fall risk
- **Safety:** Performed near stable support surface

Resistance Training

- **Tool:** Elastic band
- **Dose:** 1–2 key exercises, 3–4 days/week
- **Progression:** Increased resistance as strength improves

Methodology: Outcome Measures

Clinical Outcomes

CIPN Incidence & Grade Primary
CTCAE v5.0 Grading Scale

Chemotherapy Delivery
Dose reductions, delays, or discontinuation

Nerve Conduction (NCS/EMG)
Objective assessment of nerve function

Exercise Tolerance
6-Minute Walk Test (6MWT)

Sensory Function
Crude Touch Monofilament Testing

Grip Strength
Handheld Dynamometry

Lower Limb Strength
30-Second Chair Stand Test

Patient-Reported Outcomes

Neurotoxicity & QOL
FACT/GOG-Ntx Scale (Chinese version)

Patient Satisfaction
Numeric Rating Scale (0–10)

Assessment Schedule
Assessments conducted at Baseline (Pre-Chemo), Post-CRT 3 month

Results: Impressive Clinical Outcomes

CIPN Incidence

50%

ALL Grade 1

Study Group (n=12)

81.7%

Historical Control (Zhang et al., 2025)

↓ Markedly Reduced Severity

Chemo Delivery

0

Dose Reductions due to CIPN

3 reductions occurred for other reasons

NCS / EMG Findings (n=12)

91.7%

Developed Sensory-Predominant Axonopathy

- 41.7% below normal limits

Clinical Interpretation

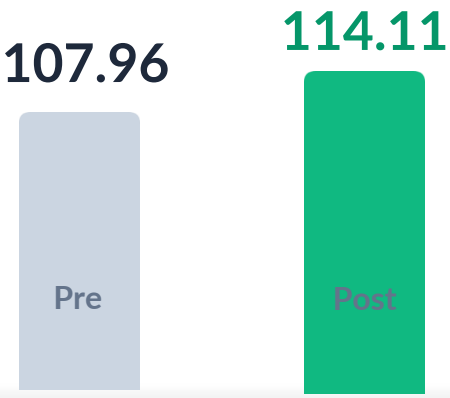
Despite objective evidence of subclinical nerve injury (axonopathy), patients remained **asymptomatic or mild (Grade 1)**.

Conclusion: Exercise may mitigate SYMPTOMATIC manifestation even when nerve injury occurs.

Results: QOL & Functional Outcomes

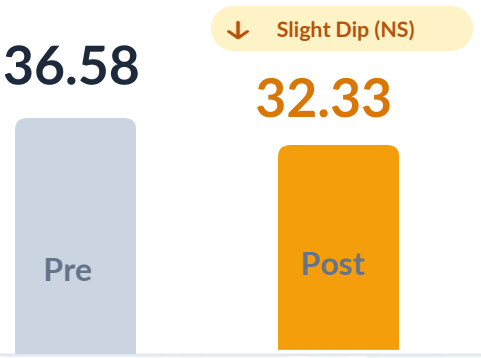
Overall Quality of Life

FACT/GOG-Ntx Total Score



Neurotoxicity Subscale

Higher score = Better outcome



Physical Function

Physical capacity remained **STABLE** throughout treatment period.

- Leg Strength: **Stable**
- Walk Distance: **Stable**

Patient Satisfaction

Hybrid Delivery Model

Face-to-Face + Telehealth

9.25

Discussion & Implications

Clinical Mechanism: Early exercise mitigates **symptomatic CIPN** even when subclinical nerve injury (NCS) occurs.

Oncological Benefit: Zero treatment delays due to CIPN supports **uninterrupted cancer treatment** for better outcomes.

QOL Value: Improvement in Quality of Life despite active chemotherapy demonstrates the program's protective effect.

Service Model: The **Hybrid Model** (Face-to-Face + Telehealth) is feasible, highly accepted, and resource-efficient.

Scalability: Protocol is adaptable to other HA cancer centers, addressing the growing survivorship demand.

Clinical Efficacy

Decoupling nerve injury from symptoms allows patients to maintain function.

System Efficiency

Telehealth integration reduces hospital visits while maintaining close monitoring.

Wide Applicability

Physiotherapy-led model enhances the oncology Multi-Disciplinary Team (MDT).

Conclusion & Future Directions

Conclusion

- The pilot CIPN physiotherapy exercise program is **FEASIBLE and SAFE** for NPC patients.
- **EFFECTIVE** in reducing symptomatic CIPN incidence **50% vs 81.7%**
- **SUCCESSFUL** in preserving physical function and Quality of Life.
- Highly **ACCEPTED** by patients (satisfaction 9.25/10) with hybrid delivery model.
- Supports **uninterrupted chemotherapy delivery** (zero delays due to CIPN).

Future Directions

1. Expand Scope: Include patients with diverse cancer types and agents linked to CIPN (e.g., Oxaliplatin, Paclitaxel).
2. Enhance Training: Implement efficient patient education models, such as chemotherapy-focused classes.
3. Standardize Protocols: Establish a unified physiotherapy protocol for CIPN management.
4. Implement at Scale: Roll out service-wide across NTWC and extend to all HA clusters.

Acknowledgements & References

Acknowledgements

Authors & Co-investigators

Lee YT, Liu YT, Kwok PW, Yeung I, Wong CY, Mui WH, Chan LY, Ho PS, Tsoi SY, Kwan WS, Lam WS, Mak MY

Supervisor

Mr. Vincent LAM, SPT (Physio)

Department

AH – Physiotherapy, Tuen Mun Hospital, NTWC

Special Thanks

To all participating patients for their commitment and the Oncology Team at TMH for their collaboration.

Key References

1. **Zhang et al., 2025** - Random forest model analysis of influencing factors of chemotherapy-induced peripheral neuropathy in patients with nasopharyngeal carcinoma: a cross-sectional survey study. *Frontiers in oncology* vol. 15 1548742. 18 Jul. 2025, doi:10.3389/fonc.2025.1548742

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