TEXTURED INSOLES AS A NOVEL APPROACH TO ADDRESS THE NEGATIVE SYMPTOMS OF CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY AND CANCER-RELATED MYELOPATHY

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INTRODUCTION

Chemotherapy-induced peripheral neuropathy and cancer-related myelopathy present a challenging aspect of cancer management due to debilitating symptoms of pain, numbness, and impaired mobility. Historically, treatment options have been limited to treating positive, painful sensory symptoms of burning, pins and needles, or tingling. Negative symptoms such as numbness and impaired proprioception have proven harder to treat yet can significantly impact mobility and quality of life. This feasibility study explores a novel approach utilizing textured insoles as a therapeutic intervention to address these negative symptoms in patients with cancer.

PILOT STUDY DESCRIPTION

A retrospective review of patients with a diagnosis of peripheral neuropathy and cancer-related myelopathy who received textured insoles for gait and balance abnormalities in a physiatry-led bracing clinic between September 2022 and June 2024.

Tests:

- **Four Stage Balance Test (4SBT)** to assess **balance**
- **Timed Up and Go (TUG)** to assess **mobility**

When performed: initial visit and ~1-month follow-up. Tested 4SBT and TUG with and without insoles.

① Stand with your feet side-by-side.	Time: _____seconds
② Place the instep of one foot so it is touching the big toe of the other foot.	Time: _____seconds
③ Tandem stand: Place one foot in front of the other, heel touching toe.	Time: _____seconds
④ Stand on one foot.	Time: _____seconds

① Instruct the patient:

When I say "Go," I want you to:
1. Stand up from the chair.
2. Walk to the line on the floor at your normal pace.
3. Turn.
4. Walk back to the chair at your normal pace.
5. Sit down again.

NOTE: Always stay by the patient for safety.

② On the word "Go," begin timing.
③ Stop timing after patient sits back down.
④ Record time.

Time in Seconds: _____

An older adult who takes ≥12 seconds to complete the TUG is at risk for falling.

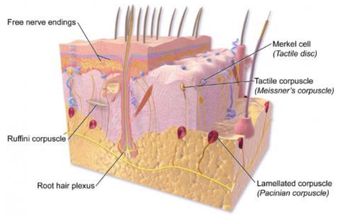
https://www.cdc.gov/steadi/media/pdfs/STEADI-Assessment-4Stage-508.pdf
https://www.cdc.gov/steadi/media/pdfs/steadi-assessment-tug-508.pdf

TEXTURED INSOLES ARE SAFE AND REASONABLE TO USE IN CANCER PATIENTS WITH NEGATIVE SYMPTOMS OF NEUROPATHY TO IMPROVE GAIT SPEED & BALANCE CONFIDENCE

RESULTS & DISCUSSION

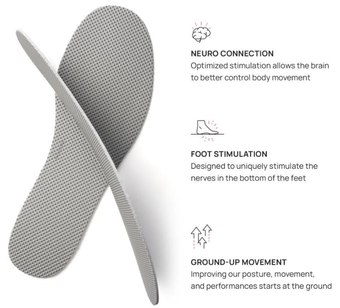
- When comparing patients with neuropathy to those with myelopathy, there was no statistically significant difference in the initial TUG (p=0.3) or 4SBT (p>0.9).
- Insole use was associated with improved TUG at both the initial visit and the one-month follow-up.
- Compared to the patients with myelopathy, the patients with neuropathy had worse TUG at initial visit with and without insoles, but better TUG scores at one-month follow-up.
- Looking at 4SBT performance, 44% of patients with myelopathy and 70% of patients with neuropathy did not progress beyond stage 1 side-by-side stance at the initial visit without insoles. Balance improved for neuropathy patients immediately when given insoles as evidenced by the increased number of patients at higher 4SBT stages. This improvement persisted at 1-month follow-up.
- There was no immediate improvement in balance at the initial visit for myelopathy patients when insoles were added, but there was an improvement noted at follow-up.

Participants demonstrated improvements in objective measures of balance and gait. Subjectively, individuals reported greater stability and confidence during ambulation. Adherence to insole use was high, and the intervention was well tolerated, with no adverse events reported.



Tactile Receptors in the Skin

Fig.2.3.1. Mechanoreceptors are distributed at different depths and respond to different temporal frequencies and types of pressure. (Credit: Blausen.com Staff. Provided by: Wikipedia. License: CC-BY 3.0)



CONCLUSIONS

Textured insoles may represent a promising supportive care strategy for patients experiencing negative sensory symptoms related to CIPN and cancer-related myelopathy. By enhancing sensory feedback, this low-risk intervention has the potential to improve mobility and quality of life. Further investigation through randomized controlled trials is warranted to evaluate efficacy and long-term benefits.

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