

# Transdermal Magnesium for the Treatment of Peripheral Neuropathy in Chronic Kidney Disease: A Single-Arm, Open-Label Pilot Study

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## Abstract

**Introduction:** Peripheral neuropathy is common in chronic kidney disease (CKD) and may be multifactorial in origin, resulting from uremia, hyperkalemia, and diabetes. Previous studies have suggested that magnesium plays a crucial role in chronic pain. Studies evaluating magnesium in neuropathy have demonstrated mixed results.

**Aims:** To provide preliminary data on the effectiveness of transdermal magnesium in treating peripheral neuropathy related to CKD.

**Methods:** Twenty participants with advanced CKD were enrolled from a major teaching hospital clinic in Sydney, Australia. Each participant was provided with a spray bottle containing magnesium chloride and instructed to apply five sprays to each limb affected by neuropathy daily for 12 weeks. Participants completed the Neuropathy Total Symptom Score-6 (NTSS-6) every 4 weeks during follow-up. Serum magnesium concentrations were measured at 4-week intervals.

**Results:** Twenty participants were recruited, of which 14 completed the 12-week follow-up period. Mean age was 78.90 years, 80.00% were female and mean estimated glomerular filtration rate was 9.78 mL/min/1.73 m<sup>2</sup>. With intention to treat analysis (mean [95% confidence interval]), NTSS-6 was significantly reduced at weeks 8 (4.04 [2.43–5.65]) and 12 (4.26 [2.47–6.05]), compared with baseline (6.92 [5.29–8.55]),  $p < 0.05$ . Serum magnesium concentration did not change significantly during the study.

**Conclusion:** This pilot study suggests that transdermal magnesium may be beneficial in reducing frequency and severity of peripheral neuropathic symptoms in patients with advanced CKD.

**Trial Registration:** [australianclinicaltrials.gov.au](https://australianclinicaltrials.gov.au).

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