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**Feasibility of ultrasound-guided percutaneous placement of peripheral nerve stimulation electrodes in a cadaver model: part one, lower extremity.**

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**Abstract**

**BACKGROUND AND OBJECTIVES:**

Peripheral nerve stimulation (PNS) is analgesic for some lower extremity neuropathic pain syndromes. PNS currently involves open surgical placement of electrode(s). Increasingly, ultrasound guidance is used for perioperative neural block. Minimally invasive placement of PNS electrodes for lower extremity targets using ultrasound guidance has not been reported. We hypothesized that ultrasound-guided placement of PNS electrodes was feasible.

**METHODS:**

Four cadaver mid-thigh transected fresh frozen specimens were studied. Specimens were scanned utilizing a 14 to 7 MHz linear probe and electrodes were placed proximal to the tibial, peroneal, and sciatic nerves at various locations. Anatomical dissection was performed to check placement accuracy and evaluate for grossly visible neural injuries.

**RESULTS:**

Acceptable locations for ultrasound-guided electrode placement were: (1) tibial nerve, approximately 8 to 14 cm superior to the medial malleolus above the tarsal tunnel, or at the upper popliteal fossa; (2) peroneal nerve, approximately 2 to 4 cm inferior to the lateral fibular head or at the upper popliteal fossa; (3) sciatic nerve immediately superior to the bifurcation (high popliteal area); and (4) lateral sural nerve at the lower popliteal fossa. No grossly visible neural injuries were seen. Electrode placements appeared to be in satisfactory locations for stimulation.

**CONCLUSIONS:**

Ultrasound imaging to facilitate peripheral nerve electrode placement is feasible. This new minimally invasive approach to lead placement requires further study to determine trial implantation criteria, optimal locations, anchoring techniques, and best clinical practice.