

*Peripheral Nerve Stimulator Device
in 4 Limb Amputation:
No Pain Since Implant/Explant*

Vipin Bansal MD, Brandon Hou MD,
Yawar Qadri MD PhD
Children’s Healthcare of Atlanta
Emory University School of Medicine

Introduction

- 17-year-old with strep throat, subsequent multi-organ failure requiring ECMO.
- Hospital course complicated by renal failure and severe limb ischemia requiring amputation of all four limbs.
- For lower leg amputations, a lumbar epidural was placed at level of L2-L3 using landmark guidance.
- For upper extremity amputations, bilateral infraclavicular brachial plexus blocks were performed with ultrasound.
- After persistent lower left leg phantom pain, the family agreed to placement of peripheral nerve stimulator (PNS).
- Permission for this case report was obtained by patient and guardian for presentation at this conference. They have consented for publication of their own story in Today.com.



Patient’s medical history, coagulation issues, and anatomy reviewed



Paperwork to place first PNS device in a children’s hospital



Placement of a PNS device targeting left femoral and sciatic nerves



Relief from PNS was assessed during implant (60 days) and 6 months later

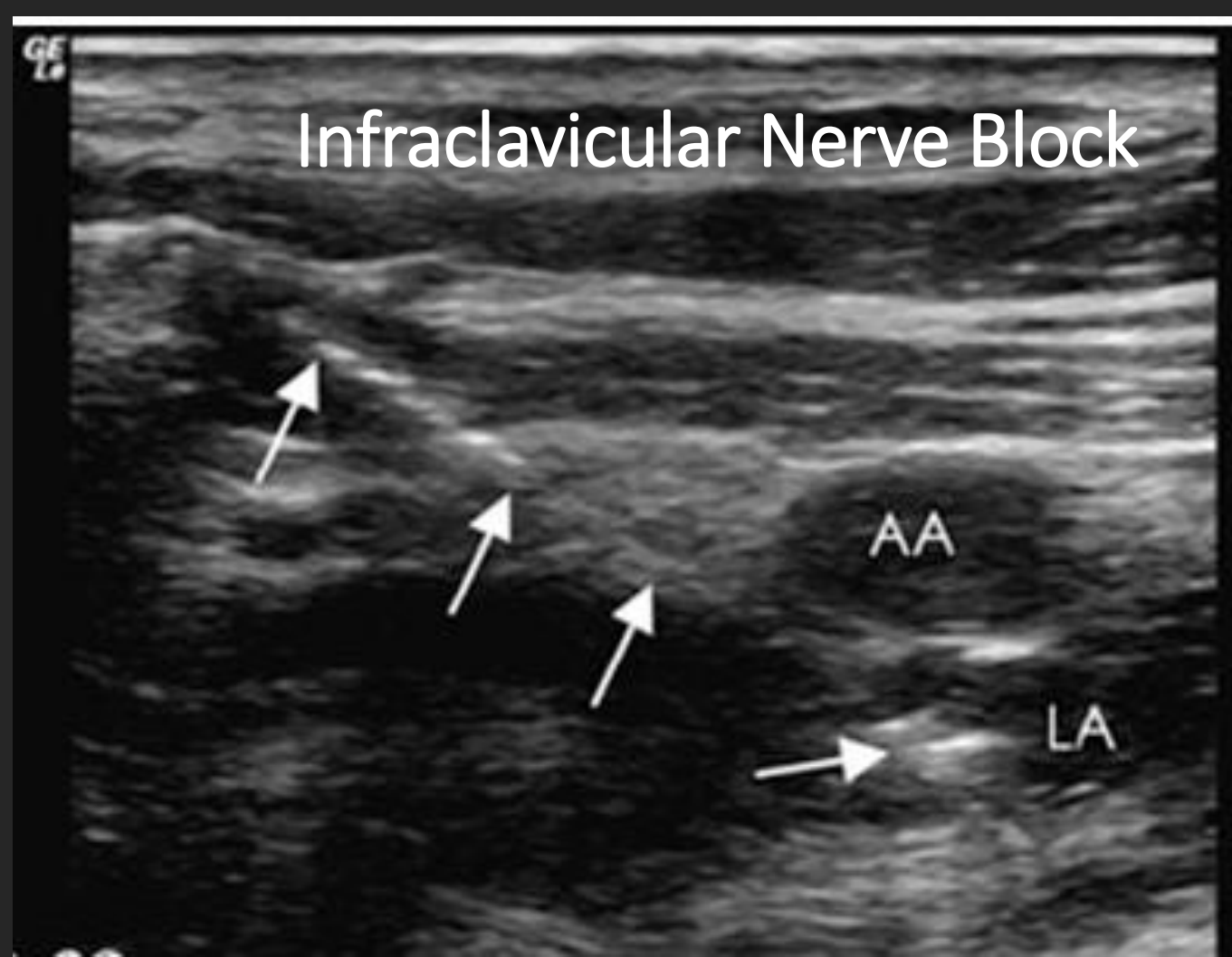
ASRA
PAIN MEDICINE

49th Annual Regional Anesthesiology
& Acute Pain Medicine Meeting

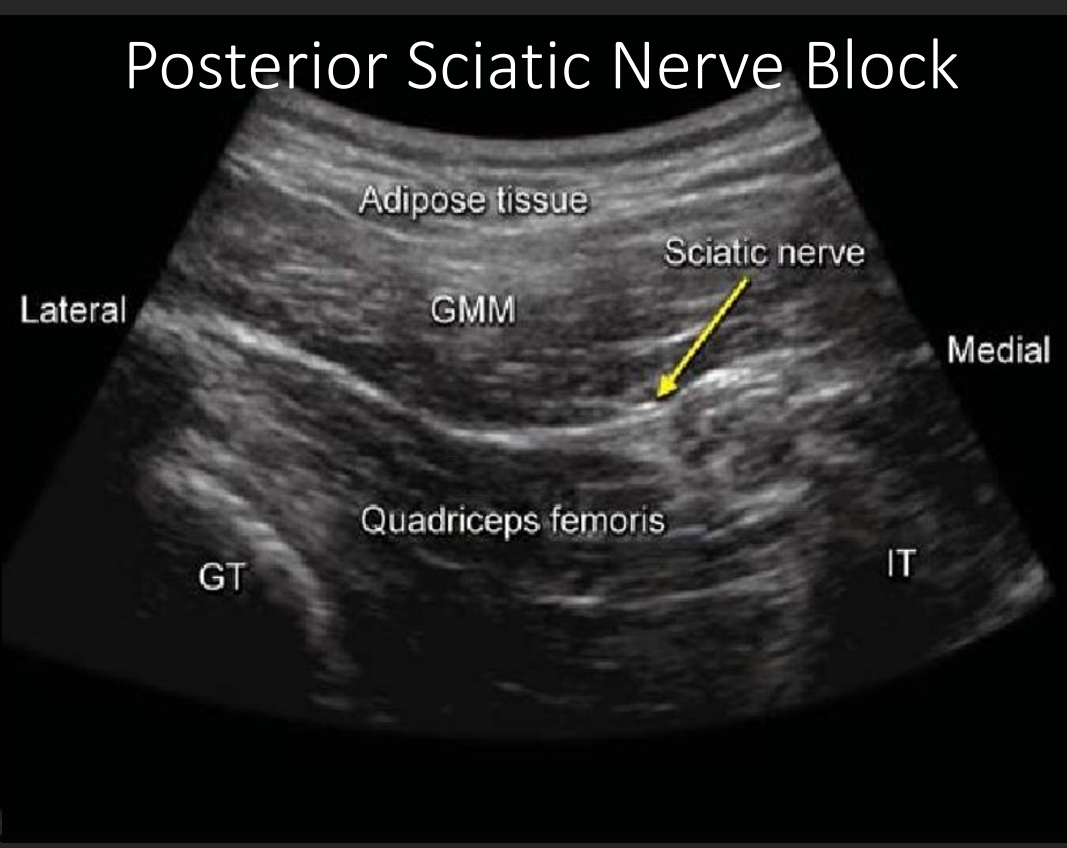
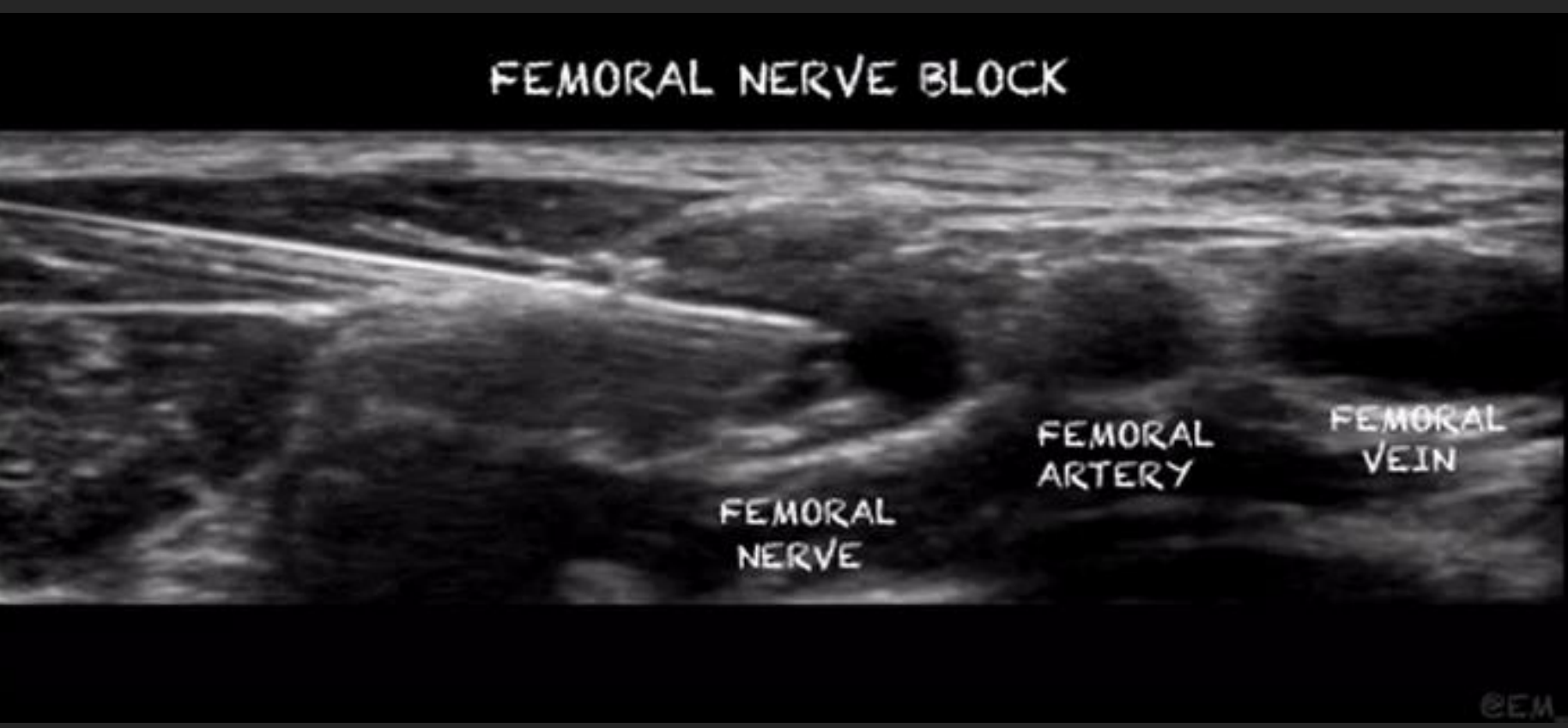
March 21-23, 2024 | San Diego, CA



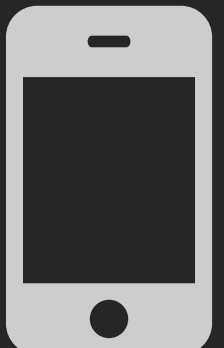
Upper Extremity Nerve Block



Lower Extremity Nerve Block



Percutaneous peripheral nerve stimulation should be explored in children to treat phantom pain



Take a picture to download the paper from Today.com



Methods

- For acute pain involving lower leg amputations, we placed lumbar epidural at level of L2-L3 using landmark guidance.
- For upper extremity amputations, we chose to perform bilateral infraclavicular brachial plexus blocks.
- For the following month, we continued patient on ketamine infusion, methadone, gabapentin, and a dilaudid PCA.
- She continued to have phantom pain, so we decided to use PNS instead of intrathecal pump or spinal cord stimulator (SCS) to avoid concerns of neuraxial bleeding and infection. Our patient was on anticoagulation medications as well as antibiotics for an active stump infection.
- Percutaneous PNS leads placed under ultrasound guidance to target the left femoral and sciatic nerves with motor or paresthesia verification as tolerated by patient.

Case History

- We had excellent acute pain control postoperatively with epidural and infraclavicular nerve blocks. Plans for long term catheter infusions were complicated because she was placed on anticoagulants to minimize potential complication of DVT. In addition, she was not a candidate for targeted muscle reinnervation (TMR) due to her active stump infection, which can reduce neuropathic pain.
- Despite multiple pain meds, patient complained of phantom and stump pain in her left leg. With PNS device in place, she received physical therapy and did not require any narcotics and had zero pain scores. Gabapentin was also stopped to avoid potential suicidal ideations.
- We are now several months from removal of PNS device and our patient has been pain-free and is currently not using any prescription pain medications.

Discussion

- Patient is healthy girl who recovered from devastating septic shock, underwent amputations of all four limbs, but was able to stay in good spirits despite all odds.
- We managed acute pain with neuraxial and regional nerve blocks, but subacute and chronic pain, such as residual limb and phantom pain, was more difficult to control with medical management. With PNS placement, her pain scores dropped to zero.
- Patient is back in school finishing her senior year. She is not on any pain meds. Our patient’s success suggest that neuromodulation occurred at both peripheral and central level. We recommend PNS technology as a viable option for long term chronic pain control for pediatric patients.

References

1. Alviar MJ, Hale T, Dungca M. Pharmacologic interventions for treating phantom limb pain. Cochrane Database Syst Rev. 2016 Oct 14;10(10):CD006380.
2. Limakatso K, Parker R. Treatment Recommendations for Phantom Limb Pain in People with Amputations: An Expert Consensus Delphi Study. PM R. 2021 Nov;13(11):1216-1226.
3. Modest JM, Raducha JE, Testa EJ, Ebersson CP. Management of Post-Amputation Pain. R I Med J (2013). 2020 May 1;103(4):19-22.
4. Ilfeld BM, Khatibi B, Maheshwari K, Madison SJ, Esa WAS, Mariano ER, Kent ML, Hanling S, Sessler DI, Eisenach JC, Cohen SP, Mascha EJ, Ma C, Padwal JA, Turan A; PAINfRE Investigators. Ambulatory continuous peripheral nerve blocks to treat postamputation phantom limb pain: a multicenter, randomized, quadruple-masked, placebo-controlled clinical trial. Pain. 2021 Mar 1;162(3):938-955.