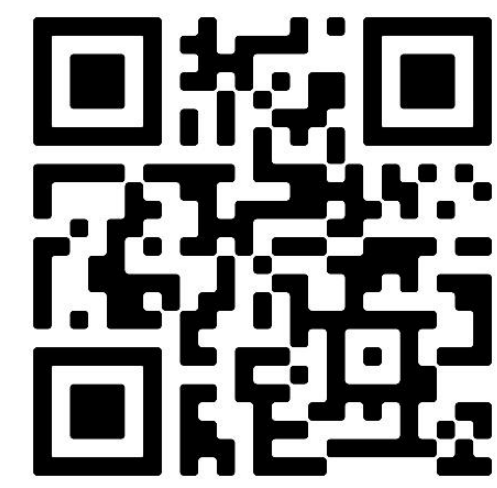
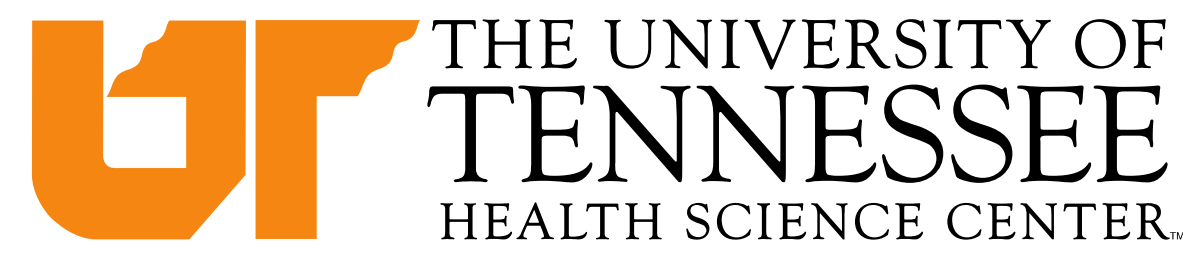




Genivs Plane block: A Single Catheter Strategy Targeting Genicular and Vastus Innervation for Knee Analgesia after Pediatric Through-Knee Amputation

Jerry Jones, MD^{1,2}, Madeline Eskin, MBA¹, Srish Sharma, MD³, Vipin Bansal, MD³

¹College of Medicine, The University of Tennessee Health Science Center, ²East Memphis Anesthesia Services, ³Children's Healthcare of Atlanta, Emory University School of Medicine



Scan to download the abstract

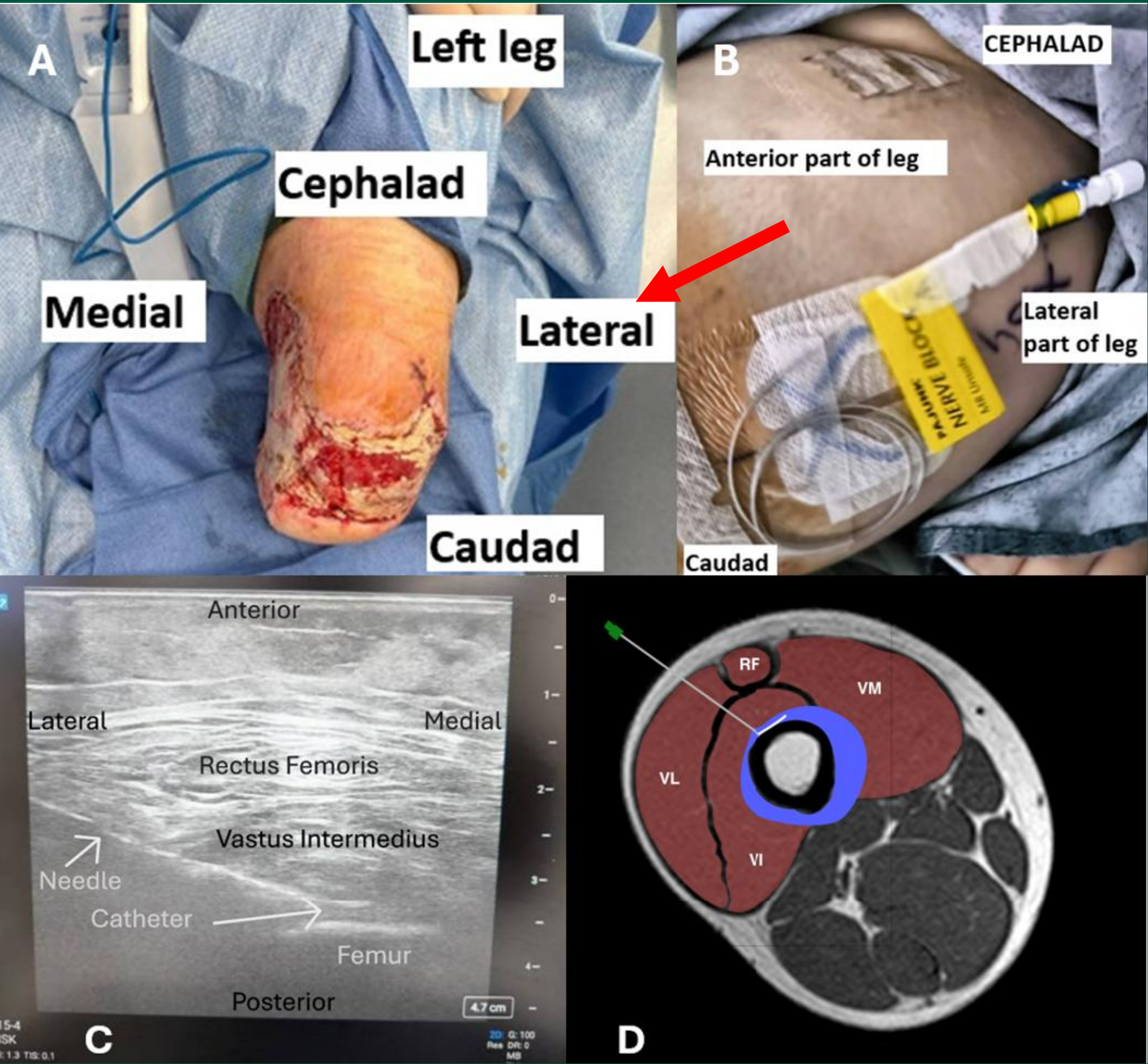
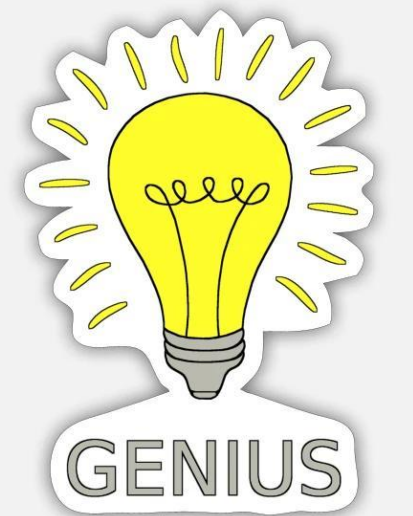
Introduction:

- Postamputation pain is a significant clinical challenge, particularly for trauma patients who are at high risk for prolonged opioid exposure and chronic phantom limb pain.
- Conventional regional anesthesia for knee-level amputations requires multiple nerve blocks that lead to undesirable motor weakness.
- Anatomic studies suggest that nociceptive input from the knee and surrounding structures converges at the periosteal and periarticular regions of the distal femur.
- The Genivs plane block is a novel technique with a periosteal approach that targets a cluster of peripheral nerve blocks: the genicular, iPack, and vastus nerves at distal sites.

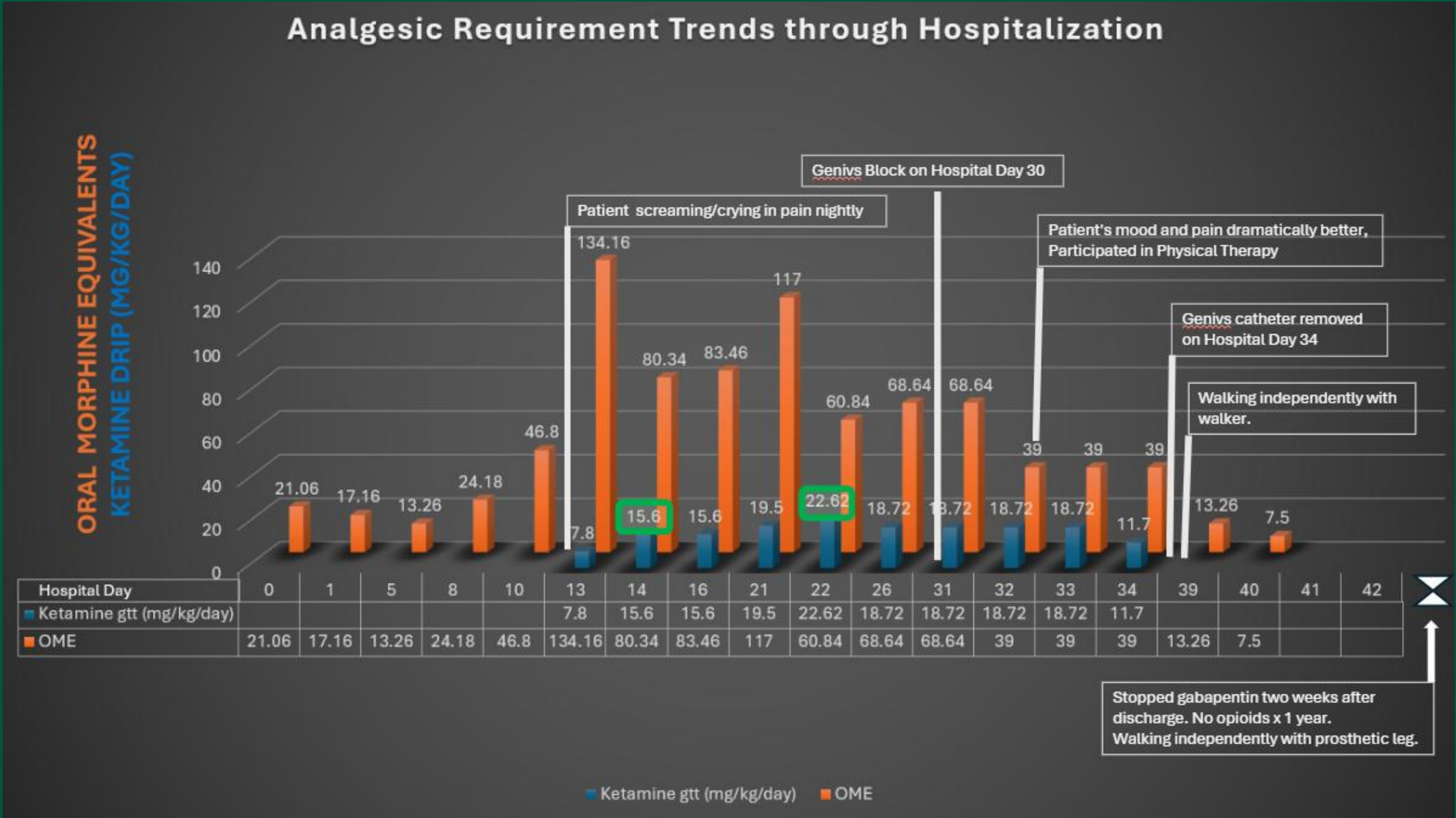
Case:

- An 11-year-old, 78 kg male suffered a traumatic through-knee amputation and had severe diffuse knee and distal sciatic phantom pain despite initial treatments including targeted muscle re-innervation (TMR), a lumbar epidural, single shot nerve blocks, ketamine infusion and escalating systemic opioids.
- On postoperative day 30, a continuous distal femoral periosteal catheter was placed in the plane between the vastus intermedius and the anterior femoral periosteum for 5 days.
- Immediately following the intervention, the patient's pain scores dropped by 70% and scheduled opioid use decreased by 50%.
- The patient maintained full quadriceps motor strength, enabling immediate participation in physical therapy and rehabilitation.
- At monthly follow-ups for last 10 months, the patient has not required further pain medications and has remained free of phantom pain.

Use the periosteum as a delivery mechanism?? WHAT A GENIUS PLAN: A novel plane that targets all nerves innervating the knee 'GENIVS': GENicular, Ipack, VastuS nerves



(A) Patient's left lower limb prior to catheter placement. Red arrow: approximate needle insertion point. (B) catheter securement on the lateral thigh. (C) Ultrasound image demonstrating needle trajectory and catheter placement adjacent to the anterior periosteum of the distal femur. (D) Stylized illustration of needle approach, circumferential local anesthetic spread and catheter advancement for Geni-vs continuous nerve block.



Discussion:

- The primary analgesic mechanism may include blockade of periosteal nociceptive afferents at the densely innervated distal femoral metaphysis.
- Clinical evidence in adult total knee arthroplasty patients suggests that local anesthetic spreads circumferentially around the distal femur to reach the genicular nerves and the posterior capsular sensory branches covered by the iPack block.
- Sustained suppression of peripheral nociceptive input via a continuous block may facilitate neuromodulation, reducing the long-term frequency and intensity of phantom limb pain.
- The Genivs block offers a simple, yet comprehensive motor-sparing regional technique that is well-suited for complex knee-level amputations or other knee surgery.

References:

- Tran DQH, et al. Innervation of the anterior knee capsule. Reg Anesth Pain Med. 2018;43:407-414.
- Rios A, Jones J. PACU Efficiency: Anesthesia Plan, Predictors of Recovery Time, and Outcomes in 3,063 Ambulatory Total Joint Arthroplasty Patients. Poster presented at: ASRA Spring Meeting; 2025.
- Mach DB, et al. Origins of skeletal pain: sensory and sympathetic innervation of the mouse femur. Neuroscience. 2002;113:155-166.
- Pyant J, et al. High volume genicular blocks spread circumferentially around the femur and potentially eliminate the need for iPack. Poster presented at: ASRA Spring Meeting; 2023.
- Ilfeld BM, et al. Continuous peripheral nerve blocks and phantom limb pain. Pain. 2021;162:938-955.