

Preoperative Ultrasound-Guided Cryoneurolysis for Total Knee Arthroplasty: A Feasibility and Safety Pilot Study

N. Andoh, MD • W. Perillo, DO • V. Frenk, MD • J. Cortina, RN • T. Bowling, MD

Quinnipiac University • St. Vincent's Medical Center (Hartford HealthCare) • Integrated Anesthesia Associates (Fairfield, CT)



CONCLUSION

Preoperative ultrasound-guided cryoneurolysis was feasible and well tolerated, with substantial immediate reduction in patient-reported pain scores.

49/50

Procedures completed
(98% feasibility)

6.96 → 1.28

Mean activity NRS
pre → immediately post procedure

96%

Reported lower pain
immediately post

BACKGROUND AND OBJECTIVES

BACKGROUND

- Post TKA pain remains significant despite multimodal analgesia and regional anesthesia.
- Cryoneurolysis may provide prolonged sensory analgesia via reversible Wallerian degeneration, potentially reducing opioid exposure.
- Many prior studies were industry-sponsored and/or performed without ultrasound guidance.

OBJECTIVES

- Evaluate feasibility, safety, and tolerability of ultrasound-guided preoperative cryoneurolysis as part of a standardized multimodal pathway for primary unilateral TKA.

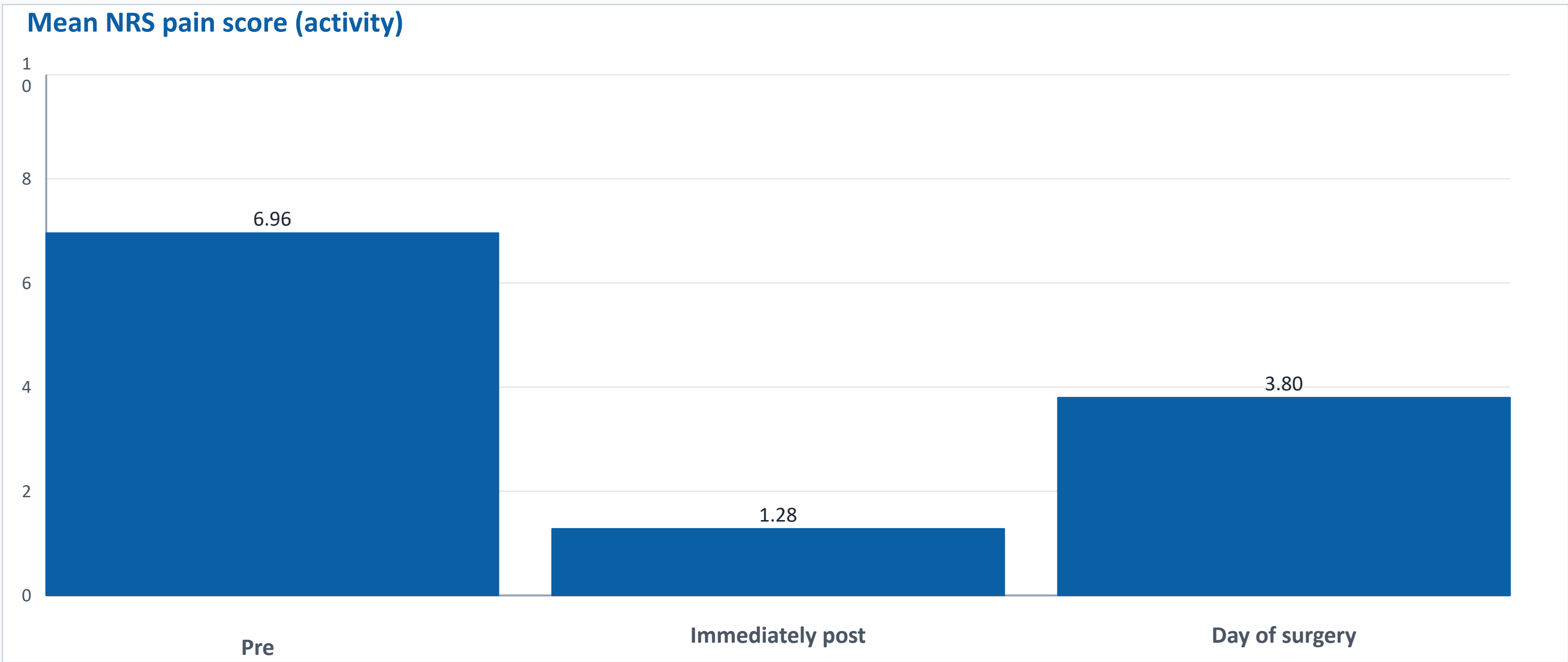
INTERVENTION (11–14 days pre-op)

- Ultrasound-guided cryoneurolysis under local anesthesia (no sedation), N = 50 TKA patients
- Targets: AFCN branches (intermediate/medial/lateral) + superior & inferior infrapatellar branches of saphenous nerve.
- Standardized perioperative pathway included femoral triangle + AFCN + IPACK blocks and non-opioid analgesics.

PRIMARY OUTCOMES

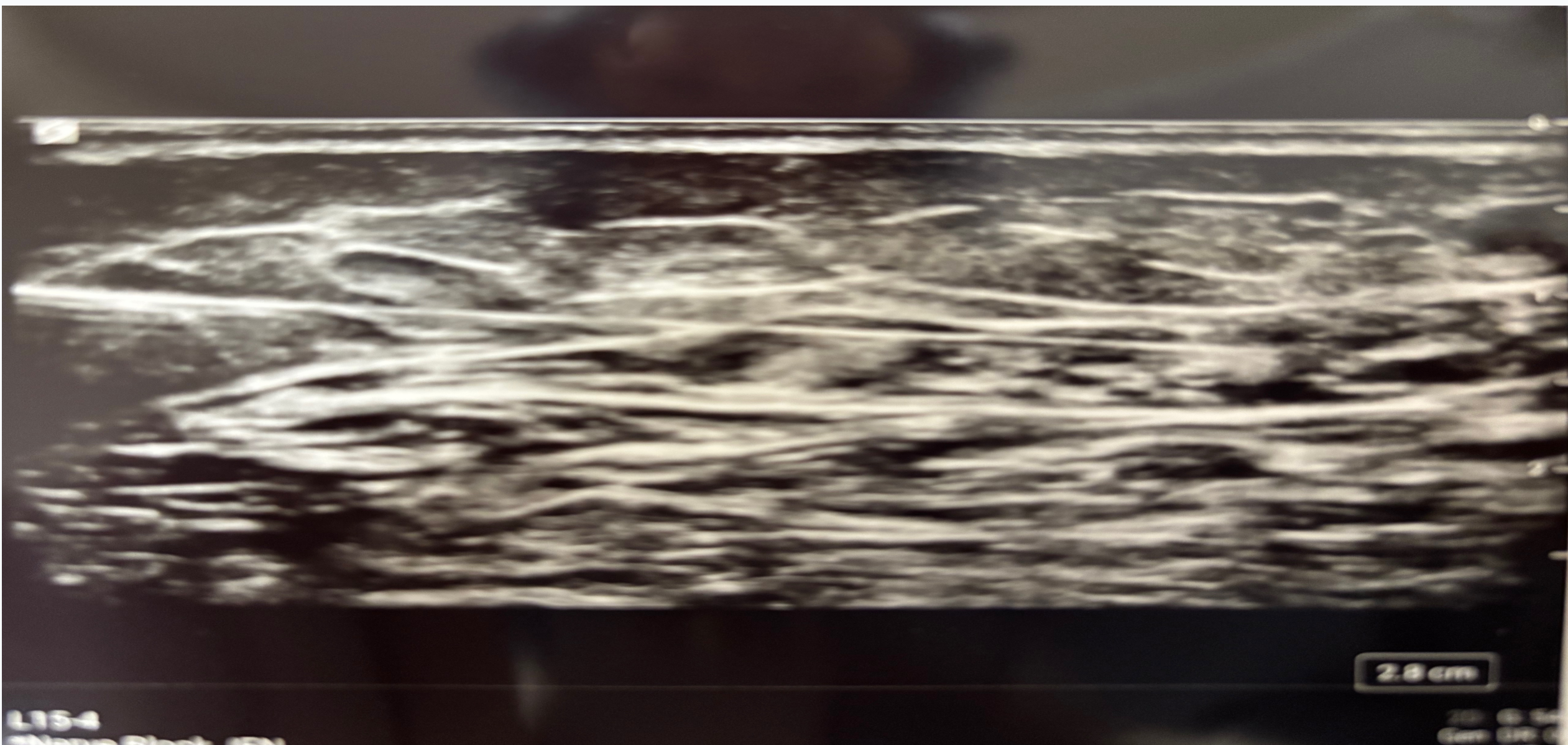
- NRS pain (0–10): pre, immediately post, day of surgery.
- Tolerability (patient report).
- Short-term and ~3-month adverse events.

RESULTS



SUMMARY

- Cryoneurolysis completed in 49/50 patients (1 patient requested abort after first injection).
- 48/50 (96%) reported lower NRS after treatment ($p < .001$).
- Mean activity NRS: 6.96 pre-procedure → 1.28 immediately post-procedure ($\Delta -5.68$).
- Day-of-surgery baseline pain: 42/50 (84%) reported lower pain; mean NRS 3.8.
- Cohort: 17 male (66–87y) and 33 female (53–86y).



SAFETY, CONCLUSIONS, REFERENCES

SAFETY AND ADVERSE EVENTS

- Short-term: 1 small injection-site hematoma; 1 local injection-site infection (surgery postponed).
- Follow-up (~3 months): 2 patients reported intermittent numbness/tingling at injection sites, otherwise no self-reported significant adverse events.

CONCLUSIONS

- Ultrasound-guided preoperative cryoneurolysis targeting anterior femoral cutaneous and infrapatellar nerves was feasible, safe, and well tolerated within a multimodal pathway for TKA.
- Observed changes reflect preoperative pain modulation; postoperative analgesic efficacy was not assessed in this pilot.

LIMITATIONS

- No control group; single-center quality-improvement design.
- Endpoints focused on preoperative pain and safety; opioid consumption, functional recovery, and long-term outcomes were not measured.

NEXT STEPS

- Independent controlled studies to evaluate analgesic efficacy and durability, opioid-sparing effects, and functional outcomes (including PT benchmarks).

REFERENCES

1. Goodwin B, et al. Preoperative cryoneurolysis for peri- and post operative pain in total knee arthroplasty: a systematic review and pooled analysis. Pain Management. 2025;15(8):527–534.
2. Jennewine BR, et al. Body habitus impact on success of cryoneurolysis for postoperative total knee arthroplasty pain control: a retrospective cohort study. Arthroplasty Today. 2023;22:101164.
3. Mihalko et al. Cryoneurolysis before total knee arthroplasty in patients with severe osteoarthritis for reduction of postoperative pain and opioid use in a single-center randomized controlled trial. J Arthroplasty. 2021;36(5):1590–1598.
4. Dasa V, et al. Percutaneous freezing of sensory nerves prior to total knee arthroplasty. Knee. 2016;23(3):523–528.