



# Trends in Peripheral Nerve Block use for Knee Procedures in Adult & Pediatric Patients at a High-Volume Orthopedic Surgical Center

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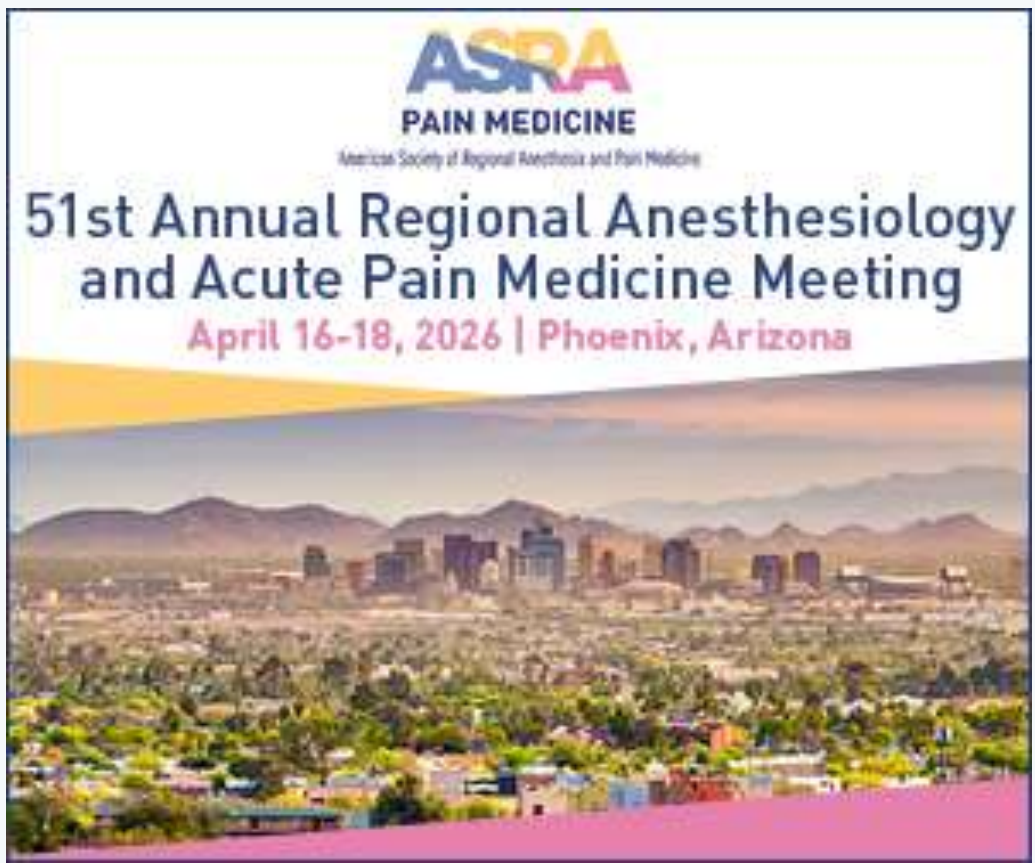
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## INTRODUCTION

- Post-knee surgery pain is often managed with adductor canal blocks (ACB), though anterior and posterior gaps remain.
- Genicular nerve blocks (GNB), anterior femoral cutaneous nerve blocks (ACFNB), and infiltration between the popliteal artery and capsule of the knee (iPACK) blocks target additional anterior and posterior pain pathways.
- Evidence is mainly adult-focused, with limited pediatric data.
- This study examines adult and pediatric utilization trends at a high-volume orthopedic center.

## METHODS

- After IRB approval (IRB#2024-1639 & IRB#2016-436), we retrospectively queried Epic anesthesia records between 01/01/16 – 12/31/24, facilitated by Epic SlicerDicer.
- Included patients <18 and 18–80 years receiving ACB, GNB, iPACK, and/or ACFNB.
- Extracted block type, procedures, demographics, ASA status, and provider-level data.
- This study was in accordance with Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines<sup>4</sup>.

Table 1: Frequency table for adult and pediatric by block

| Block Type by age                    | Jan 1 – Dec 31 2016 | Jan 1 – Dec 31 2017 | Jan 1 – Dec 31 2018 | Jan 1 – Dec 31 2019 | Jan 1 – Dec 31 2020 | Jan 1 – Dec 31 2021 | Jan 1 – Dec 31 2022 | Jan 1 – Dec 31 2023 | Jan 1 – Dec 31 2024 |
|--------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Adductor Canal <18 years             | 350                 | 411                 | 452                 | 482                 | 382                 | 491                 | 553                 | 639                 | 646                 |
| Adductor Canal ≥18 years             | 5093                | 6631                | 6876                | 7387                | 5997                | 7535                | 8685                | 9761                | 10195               |
| iPACK <18 years                      | 0                   | 48                  | 127                 | 176                 | 149                 | 255                 | 306                 | 375                 | 389                 |
| iPACK ≥18 years                      | 95                  | 2141                | 4356                | 5156                | 4317                | 5672                | 6600                | 7543                | 7741                |
| Genicular <18 years                  | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 53                  | 378                 | 479                 |
| Genicular ≥18 years                  | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 693                 | 4051                | 6626                |
| Anterior Femoral Cutaneous <18 years | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 19                  | 103                 |
| Anterior Femoral Cutaneous ≥18 years | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 0                   | 230                 | 2044                |

Figure 1: Adult Lower Extremity Block Trends

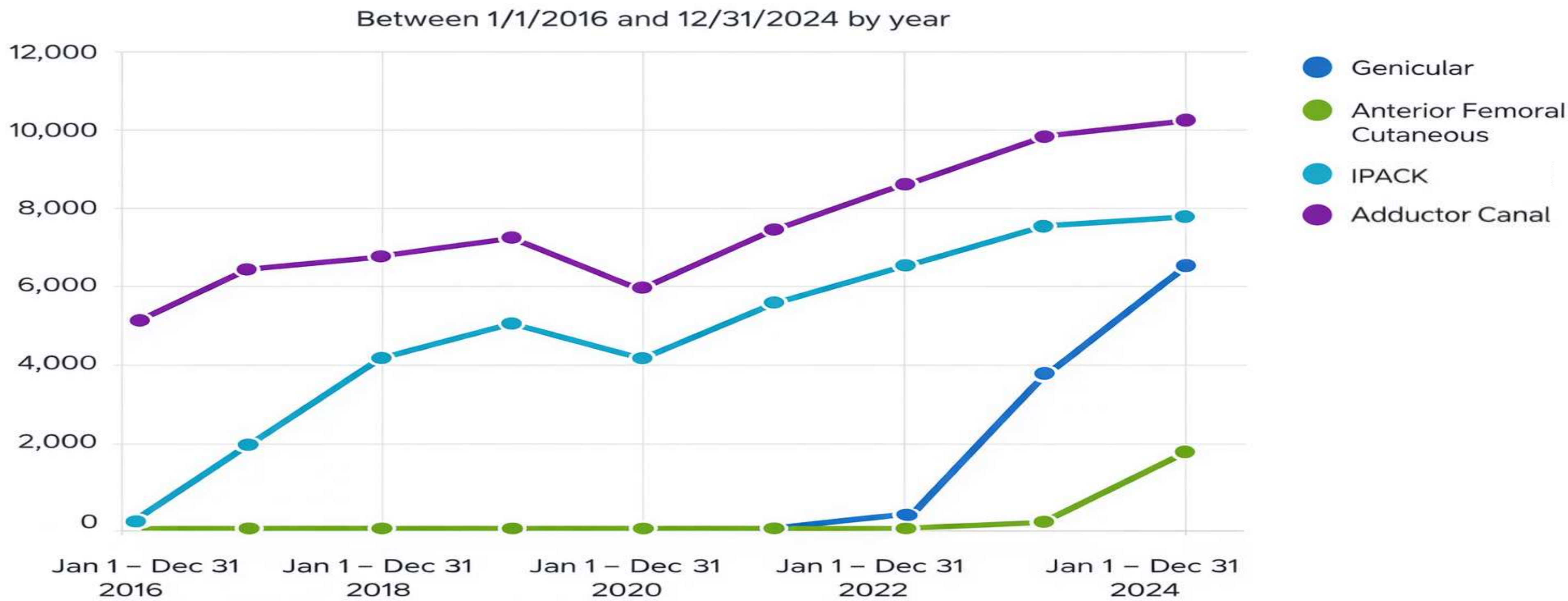
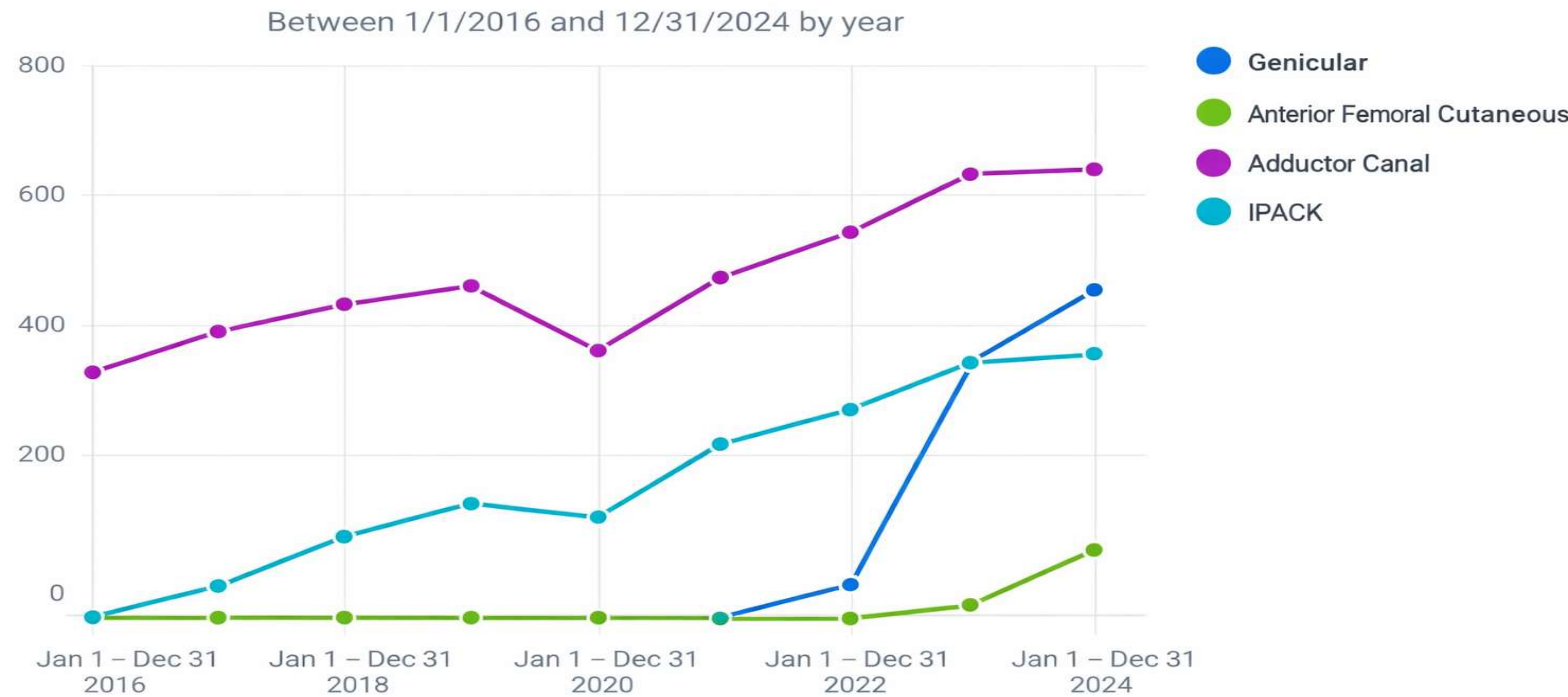


Figure 2: Pediatric Lower Extremity Block Trends



## RESULTS

- ACB remained the most frequently used block (2016–2024) across adult and pediatric cases.
- iPACK introduced in 2016 (adults) and 2017 (pediatrics), with rapid growth; 95 to 7,741 in adults and 0 to 389 in pediatric (Table 1, Figure 1 & 2).
- GNB first documented in 2022 (with ACB + iPACK) and increased  $\approx 9$  times in both adults (693 to 6,626) and pediatrics (50 to 466) by 2024 (Table 1, Figure 1 & 2).
- AFCNB was introduced in 2023, in combination with ACB/iPACK/GNB for TKA and later arthroscopy, with rapid adoption through 2024, from 230 to 2,044 adult cases and 19 to 103 pediatric cases between 2023–2024 (Table 1, Figure 1 & 2).

## DISCUSSION

- Our institutional data shows increasing adoption of motor-sparing blocks, with new blocks implemented in adult TKA or arthroscopy cases before more widespread adoption in adolescent knee surgeries
- Combination blocks reflect a growing emphasis on anterior-posterior balanced analgesia opioid sparing approaches and support of early ambulation and same day discharge.
- Future studies will evaluate block adoption dynamics and patient outcomes, including pain, opioid use, and function.

References →

