

Fascial Plane Blocks in Abdominal Procedures in Children Aged 2-12 Years Old: A Systematic Review

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References



Introduction

With the field of anesthesiology continually evolving, the development of fascial plane blocks has become a vital advancement in providing effective postoperative analgesia.¹ Their use has notably increased within the pediatric population. According to the U.S. FDA, a child is defined as an individual between 2 and 12 years of age.² Among the most commonly performed surgical procedures in this group are appendectomies and hernia repairs.³ Therefore, this systematic review aims to evaluate the applications of fascial plane blocks in children aged 2-12 years undergoing abdominal procedures.

Methods

This systematic review was conducted in accordance with PRISMA guidelines. The search was performed on May 6, 2025, using PubMed, the Cochrane Library, Web of Science, and the Virtual Health Library with the keywords “Pediatrics,” “Fascial Plane Block,” and “Abdominal Operation.” Articles were extracted and reviewed for relevance. Inclusion criteria required studies to be written in English, conducted in human subjects, designed as randomized controlled trials, and to involve the use of a fascial plane block during or after an abdominal procedure in children aged 2-12 years. A reporting quality assessment was conducted for each included study using CONSORT guidelines to evaluate risks of selection bias, performance bias, and reporting bias.

Results/Discussion

A total of 490 articles were identified for potential relevance. After removing 97 duplicates, 393 articles remained for title and abstract screening based on the predefined inclusion and exclusion criteria. Following full-text review, 20 articles⁴⁻²³ met the criteria and were included in this systematic review.

Key Findings

- Fascial plane blocks provide effective and reliable postoperative pain control in pediatric abdominal surgeries.²³
 - Across 855 reported blocks, only one failure occurred⁴, demonstrating high reliability and clinical effectiveness.
- Proper block type (TAP, QL, ESP) is essential for optimizing outcomes and safety.
 - TAP blocks are ideal for lower abdominal surgeries like appendectomies and hernia repairs²⁴ (Fig 1).

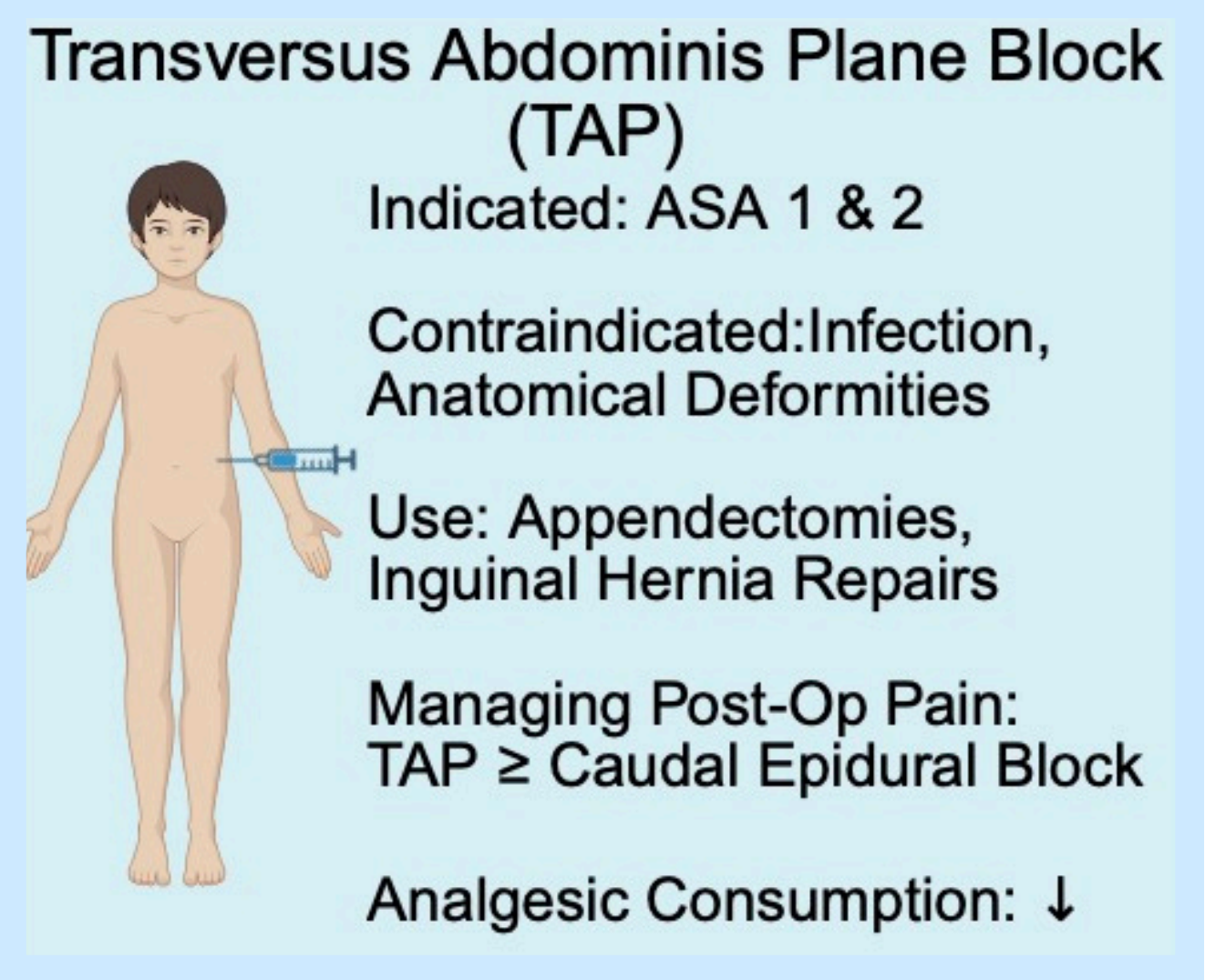


Fig 1: Indications of Transversus Abdominis Plane Block (TAP).

- QL blocks offer longer-lasting analgesia^{25,26} (Fig 2), and ESP blocks are suited for upper abdominal procedures²⁷ (Fig3).
- Accurate dosing and understanding pediatric anatomy are critical to prevent toxicity and ensure efficacy.
 - Children have lower muscle mass and unique pharmacokinetics, requiring careful calculation of anesthetic doses. Bupivacaine and ropivacaine should not exceed 2.5 mg/kg per single dose.²⁸
- Ultrasound guidance significantly reduces complications and improves block success rates.
 - Performing blocks under ultrasound visualization minimizes risks such as organ puncture or local anesthetic toxicity and improves accuracy, resulting in safer and more consistent analgesia in children.¹⁷
- Fascial plane blocks reduce opioid consumption and postoperative nausea, supporting faster recovery.
 - By effectively managing pain, these blocks reduce the need for opioids, which in turn lowers the incidence of nausea and vomiting.¹⁷

Quadratus Lumborum Block (QL)

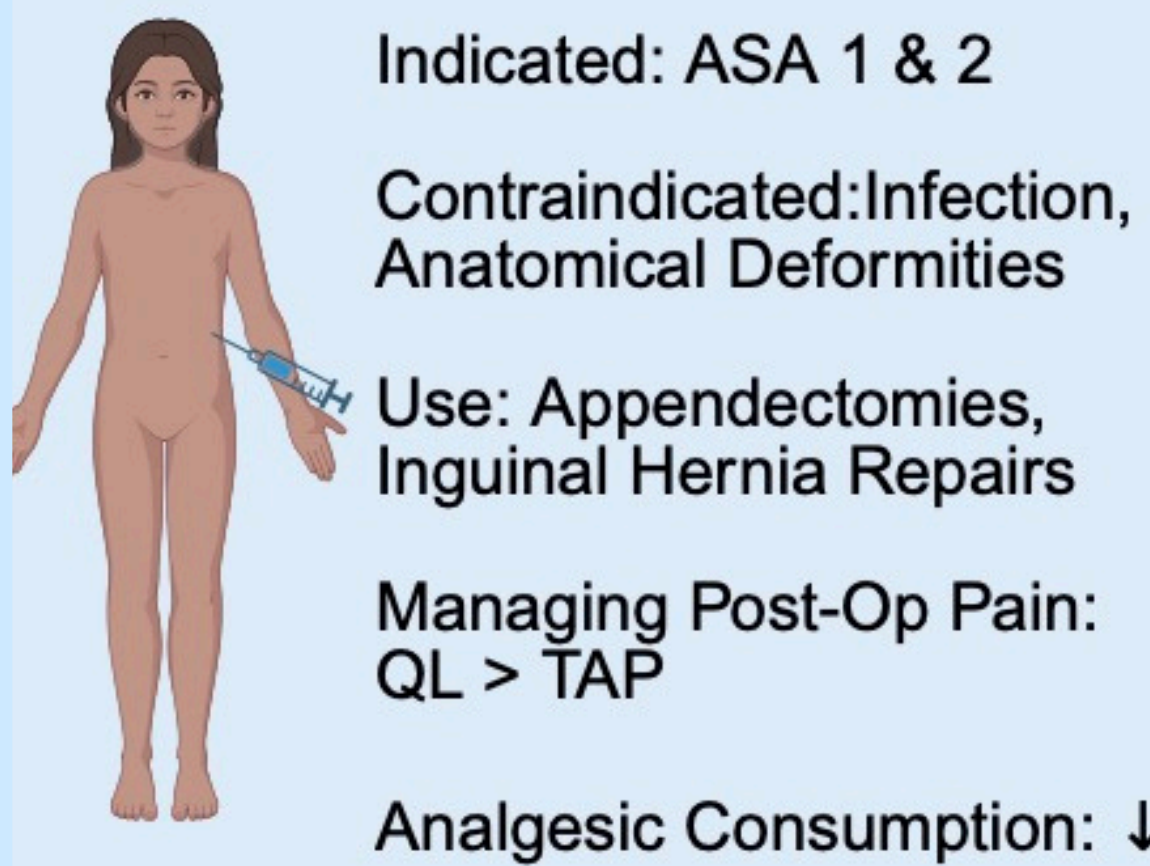


Fig 2: Indications of Quadratus Lumborum Blocks (QL).

Erector Spinae Plane Block (ESP)

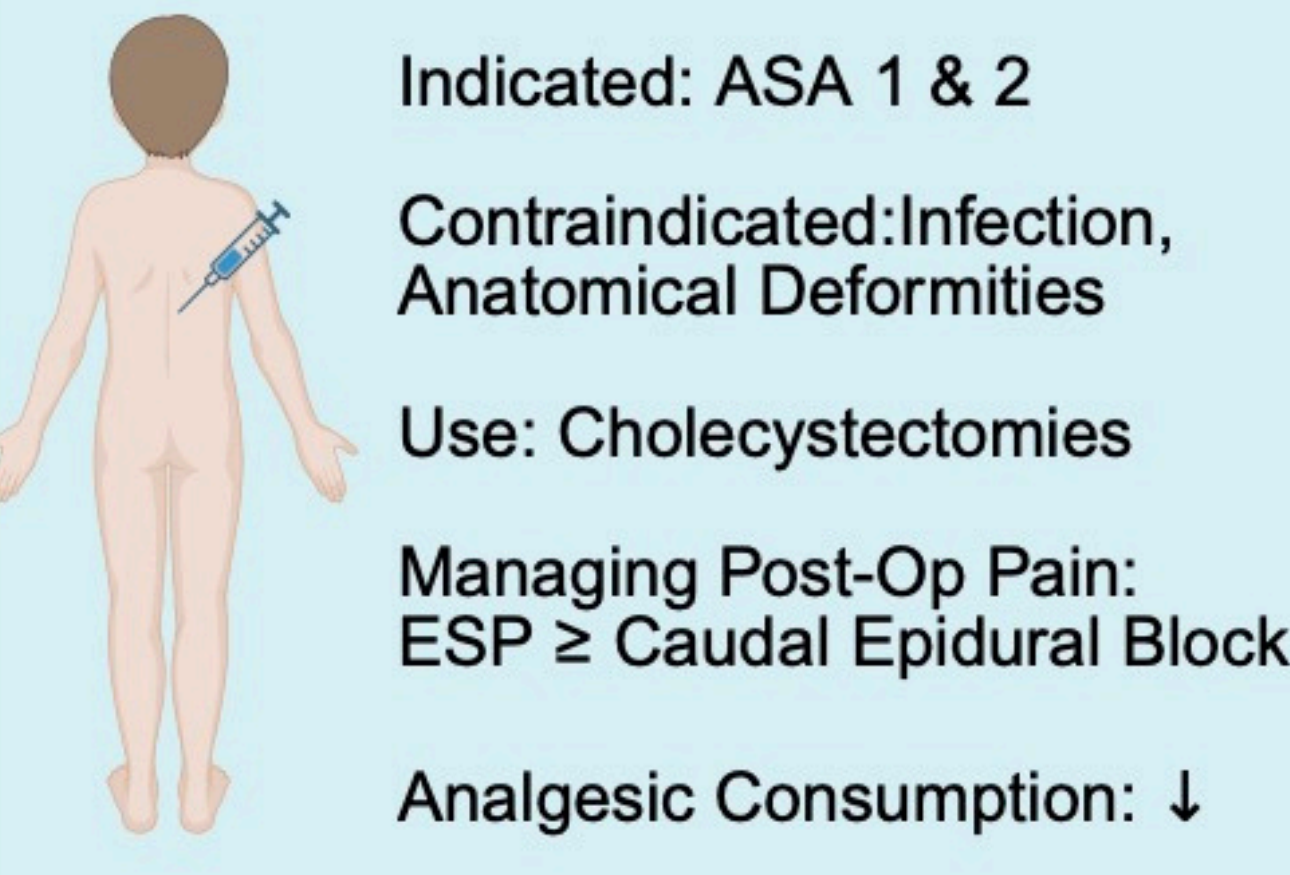


Fig 3: Indications of Erector Spinae Plane Blocks (ESP).

Conclusion

Fascial plane blocks are becoming vital tools in pediatric anesthesia, offering decreased opioid consumption, prolonged analgesia, and reduced postoperative pain^{1,17}. As the field advances, these blocks continue to redefine postoperative pain management through precise, opioid-sparing analgesia.