

# Ultrasound for Regional Anesthesia in Children

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## KEYWORDS

- Peripheral nerve blockade • Pediatric regional anesthesia • Peripheral nerve catheter
- Nerve stimulation • Ultrasound-guided regional anesthesia

## KEY POINTS

- The use of ultrasonography has expanded the application of pediatric regional anesthesia.
- One can visualize the needle advancement and injection of local anesthetic with ultrasonography.
- Ultrasonography can aid in the placement of peripheral nerve catheters to provide prolonged analgesia.

## INTRODUCTION

Advances in ultrasonography have expanded the scope of regional anesthesia practice in pediatrics. Ultrasound guidance improves the ease and safety of peripheral nerve blockade in children. It is well recognized that regional anesthesia is commonly performed in anesthetized or sedated children, contrary to adult practice.<sup>1,2</sup> Recent large pediatric databases (Pediatric Regional Anesthesia Network [PRAN]) elucidates the safety and efficacy of regional anesthesia in children.<sup>3</sup> This article is devoted to the use of ultrasound-guided pediatric regional anesthesia with its applications, techniques, and potential complications (**Table 1**).

## UPPER EXTREMITY BLOCKS

Blockade of the brachial plexus can be completed at various locations and is applicable to children undergoing surgical procedures on the upper extremity. The brachial plexus can be blocked at the axillary, infraclavicular, interscalene, and supraclavicular locations. The supraclavicular brachial plexus block is the most common upper extremity block performed in children, but the increasing use of ultrasound guidance

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Disclosures: None (S. Suresh, A. Sawardekar & R. Shah).

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<b>Table 1</b>		
<b>Common peripheral nerve blocks in children</b>		
<b>Block</b>	<b>Indications</b>	<b>Dosing</b>
<b>Upper extremity</b>		
Axillary	Surgery of the elbow, forearm, or hand	0.2–0.4 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Interscalene	Shoulder surgery, catheter placement for postoperative pain control	0.2–0.4 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Supraclavicular	Most upper extremity procedures	0.2–0.4 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Infraclavicular	Most upper extremity procedures, catheter placement	0.2–0.3 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
<b>Lower extremity</b>		
Lumbar plexus	Surgery on the hip, knee, or foot	0.2–0.3 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Femoral	Surgery on the thigh or knee (eg, knee arthroscopy)	0.2–0.3 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Saphenous	Surgery on the knee, foot, or the medial aspect of the leg below the knee	0.1–0.2 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Sciatic	Surgical procedures on the foot and ankle, knee surgery (in addition to the femoral nerve block)	0.15–0.3 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
<b>Truncal</b>		
Transversus abdominis plane block, rectus sheath	Surgery on the abdominal wall, chronic neuropathic abdominal wall pain, laparoscopic procedures, umbilical hernia repair	0.1–0.2 mL/kg 0.25% bupivacaine or 0.2% ropivacaine
Ilioinguinal/iliohypogastric	Hernia repair, groin surgery	0.075–0.2 mL/kg 0.25% bupivacaine or 0.2% ropivacaine

when performing regional anesthesia allows the practitioner to perform brachial plexus blockade at any location safely and effectively (Santhanam Suresh MD, Personal communication). Ultrasound guidance allows the clinician to better recognize brachial plexus anatomy and improves the localization of adjacent structures during needle placement.

## **AXILLARY BLOCK**

### ***Anatomy and Indications***

The axillary approach to the brachial plexus provides analgesia to the elbow, forearm, and hand. A single needle insertion at this location facilitates the blockade of the radial, median, and ulnar nerves. Although anatomic variations may exist, the radial nerve commonly lies posterior to the axillary artery, and the ulnar nerve is anterior

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