

Pediatric Musculoskeletal US-Guided Procedures

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1. Overview

This lecture introduces the principles and clinical applications of ultrasound-guided musculoskeletal procedures in pediatric patients. The session focuses on two common interventions: joint aspiration and joint injection. Emphasis will be placed on indications, procedural technique, pediatric-specific anatomical considerations, and the clinical value of ultrasound guidance in improving safety and accuracy.

2. Learning Objectives

By the end of this lecture, participants will be able to:

- Understand the main indications for ultrasound-guided joint aspiration in children.
- Describe the role of ultrasound-guided joint injection in the management of juvenile idiopathic arthritis.
- Recognize key technical principles, including sterile preparation, needle guidance, and real-time visualization.
- Identify important pediatric anatomical features relevant to safe musculoskeletal intervention.
- Appreciate the advantages of ultrasound guidance over landmark-based procedures in pediatric practice.

3. Contents

3.1. Ultrasound-Guided Joint Aspiration

- Clinical indications for arthrocentesis in children
 - Evaluation of acute painful joint effusion
 - Exclusion of septic arthritis
 - Therapeutic decompression of tense joint effusions
- Importance of rapid diagnosis in pediatric septic arthritis
- Preparation and technical considerations
 - Patient comfort, analgesia, and sedation
 - Needle selection
 - Sterile technique
- Hip joint aspiration as a representative procedure
 - Pre-procedural sonographic evaluation
 - In-plane anterior approach
 - Real-time needle guidance and aspiration
 - Specimen handling for laboratory analysis

3.2. Ultrasound-Guided Joint Injection

- Indications for intra-articular steroid injection
 - Management of juvenile idiopathic arthritis, especially oligoarticular disease
- Advantages of ultrasound guidance
 - Improved injection accuracy
 - Avoidance of extra-articular injection
 - Protection of unossified cartilage in children
- Medication considerations
 - Preferred corticosteroid agent
 - General dosing principles
- Procedural technique
 - Pre-injection ultrasound assessment
 - Identification of synovial hypertrophy and active inflammation
 - In-plane needle guidance
 - Confirmation of intra-articular placement
 - Post-injection findings and care

4. References

1. Skaggs KF, Okoli O, Naz H, et al. Bedside Aspiration for Workup of the Pediatric Septic Hip: Avoid Trips to the OR and Expedited Time to Diagnosis. *J Pediatr Orthop*. 2025.
2. Parra DA. Technical tips to perform safe and effective Ultrasound Guided steroid joint injections in children. *Pediatr Rheumatol*. 2015;13:2.
3. Young CM, Shiels WE II, Coley BD, et al. Ultrasound-guided corticosteroid injection therapy for juvenile idiopathic arthritis: 12-year care experience. *Pediatr Radiol*. 2012;42:1481–1489.
4. Thapa M, Vo JN, Shiels WE II. Ultrasound-guided musculoskeletal procedures in children. *Pediatr Radiol*. 2013.
5. Nguyen JC, et al. US Evaluation of Juvenile Idiopathic Arthritis and Osteoarticular Infection. *Radiographics*. 2017.