



# Peripheral Nerve Blocks

## The Basics

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## Why is this important?

- Frequently narcotics alone are insufficient to adequately treat pain
- Blocks may limit the need for conscious sedation
- Caveat: Do not perform with potential compartment syndrome

## Outline

**Upper Extremity:**

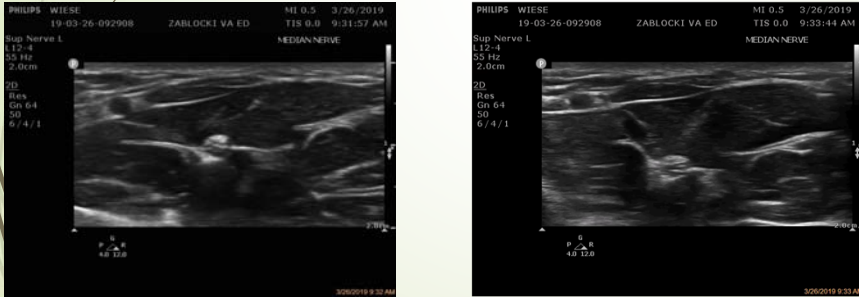
- ▀ Median
- ▀ Radial
- ▀ Ulnar

**Lower Extremity:**

- ▀ Ankle Nerves
  - ▀ Posterior Tibial
- ▀ Sciatic

## The Basics

- ▀ Identify the Nerve
  - ▀ Fascicular / "Honey-combed" appearance in cross-section
  - ▀ Typically hypoechoic fascicles with hyperechoic septations
  - ▀ Overall typically more echogenic than surrounding muscle



Prone to Anisotropy

## The Basics

- ▶ How to Proceed:
  - ▶ Perform a good physical/neurologic exam
  - ▶ Pre-scan to identify the nerve and where to best access it
  - ▶ Sterile set-up
  - ▶ Guide the needle in plane with the transducer with the nerve in cross-section
    - ▶ 22G-25G needle (Pediatric spinal needle ideal)
  - ▶ Advance the needle into the fascial plane of the nerve
    - ▶ Not into the actual nerve sheath
  - ▶ Inject anesthetic
    - ▶ Ideally it will circumferentially encompass the nerve

## The Basics

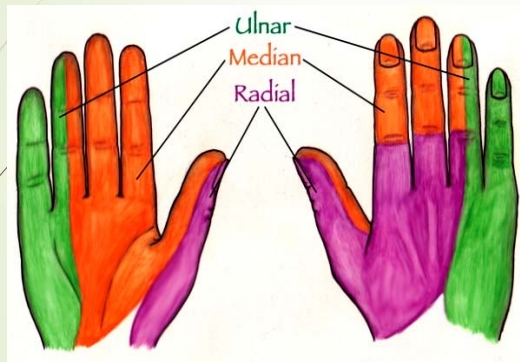




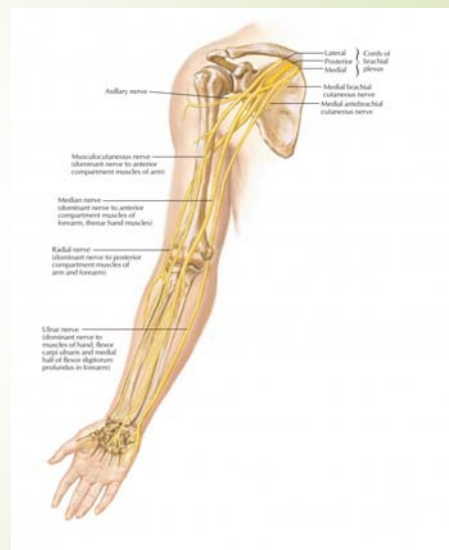
# Upper Extremity



# Upper Extremity



Start scanning at the wrist and move quickly up the forearm





## Median Nerve

- Typically lies between the flexor digitorum superficialis and the flexor carpi radialis tendons at the wrist.
- Runs through the carpal tunnel
- Usually easiest to access in the mid-forearm
- Block with ~10ml of local anesthetic



## Median Nerve



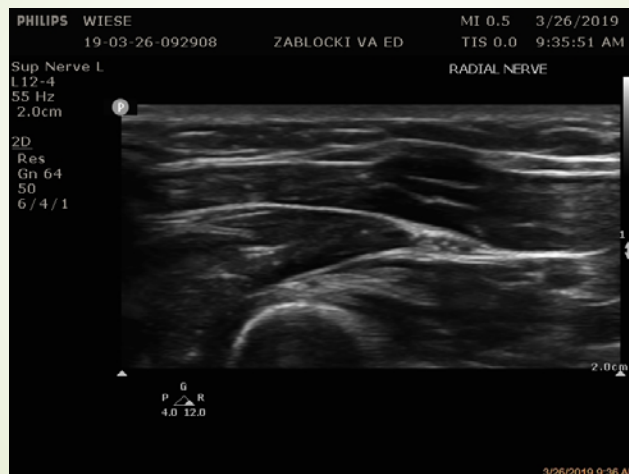


## Radial Nerve

- ▶ Fans at the wrist to innervate the posterior hand
- ▶ Runs on the **Radial Side of the Radial Artery**
- ▶ Usually easiest to access in the proximal 1/3 of the forearm
- ▶ Block with ~10ml of local anesthetic




## Radial Nerve



## Ulnar Nerve

- Runs on the **Ulnar Side of the Ulnar Artery**
- Usually easiest to access in the proximal 1/3 of the forearm
- Block with ~10ml of local anesthetic

## Ulnar Nerve



PHILIPS WIESE MI 0.5 3/26/2019  
19-03-26-092908 ZABLOCKI VA ED TIS 0.0 9:38:22 AM

Sup Nerve L ULNAR NERVE  
L12-4  
55 Hz  
2.0cm

2D  
Res  
Gn 64  
50  
6/4/1

2.0cm

3/26/2019 9:39 AM

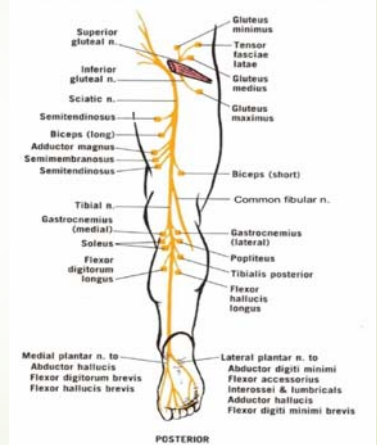
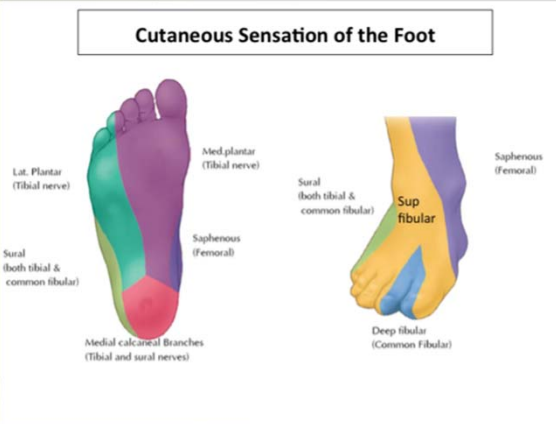
The image is a B-mode ultrasound scan of the ulnar nerve. The nerve is visible as a dark, anechoic structure with a surrounding hyperechoic sheath. The scan is performed in a longitudinal plane. Technical parameters include a 55 Hz transducer, 2.0 cm depth, and 2D mode. The patient is identified as ZABLOCKI VA ED, and the scan was performed on 3/26/2019 at 9:38:22 AM.



# Lower Extremity



# Lower Extremity






## Tibial Nerve

- Lies just **Posterior to the Posterior Tibial Artery**
- Usually easiest to access just proximal to the medial malleolus
- Block with 5-10ml of local anesthetic

## Tibial Nerve



PHILIPS WIESE MI 0.5 3/26/2019  
19-03-26-092908 ZABLOCKI VA ED TIS 0.0 9:55:33 AM

Sup Nerve L TIBIAL NERVE  
L12-4  
55 Hz  
2.0cm

2D  
Res  
Gn 64  
50  
6/4/1

0  
P A R  
4.0 12.0

3/26/2019 9:55 AM

The image is a longitudinal B-mode ultrasound scan of the tibial nerve. The nerve is visible as a dark, anechoic structure with a surrounding hyperechoic sheath. Technical parameters include a 12-4 MHz transducer, 55 Hz frame rate, and 2.0 cm depth. The patient is identified as ZABLOCKI VA ED, and the scan was performed on 3/26/2019 at 9:55:33 AM. A 2.0 cm scale bar is present on the right side of the image.




# Sciatic Nerve

- Remains basically unchanged to just proximal to the popliteal fossa
  - Common Peroneal Nerve takes off laterally
  - Start at the popliteal crease and identify the Tibial Nerve
  - Follow proximally ~5 – 10cm where the Common Peroneal Nerve joins from the superficial lateral side
- Block with ~20ml of local anesthetic



# Sciatic Nerve






## Summary

- ▶ As with all Ultrasound modalities, it takes practice
- ▶ 3 Steps:
  - ▶ Identify the Nerve
  - ▶ Guide the Needle to it
  - ▶ Surround with anesthetic
- ▶ This procedure is supported by ACEP literature and billable



## Questions





## References

- ▶ The New York School of Regional Anesthesia, Continuing Medical Education [www.nysora.com](http://www.nysora.com)
- ▶ Ma and Mateer's Emergency Ultrasound, 3<sup>rd</sup> Edition. New York: McGraw-Hill; 2014
- ▶ Jacobson JA. Fundamentals of Musculoskeletal Ultrasound, 2<sup>nd</sup> Edition. Philadelphia: Elsevier; 2013