This session provides a comprehensive and practical framework for upper extremity nerve ultrasound, emphasizing the critical integration of clinical signs with high-resolution imaging. Moving beyond a simple focus on scanning protocols, we will explore a targeted evaluation strategy rooted in a sophisticated understanding of anatomy, innervation patterns, and complex differential diagnoses. As practitioners, we recognize that a successful examination begins by closely listening to the patient, specifically identifying the exact distribution of paresthesia and the nature of muscle weakness to guide our sonographic inquiry.

The course begins with a review of the correlation between joint functions and cervical root myotomes. By analyzing specific clinical distinctions—such as a C5 deficit affecting shoulder abduction versus a C7 deficit affecting elbow extension—we will demonstrate how to accurately determine whether a patient's symptoms suggest a peripheral entrapment or a more proximal cervical root pathology.

In the section on the Median Nerve, we will correlate common systemic risk factors like diabetes and thyroid dysfunction with the classic sonographic hallmarks of Carpal Tunnel Syndrome (CTS). Beyond identifying a simple increase in cross-sectional area (CSA) at the carpal tunnel inlet, we will discuss the significance of the "notch sign," the flattening ratio of the nerve, and the loss of the normal fascicular pattern due to endoneurial edema. We will also address the necessity of scanning the upper arm in suspected Anterior Interosseous Nerve (AIN) syndrome, specifically when distal muscle involvement does not perfectly align with isolated entrapment.

For the Ulnar Nerve, our focus shifts to assessment techniques at the Cubital Tunnel and Guyon's Canal. We will review the diagnostic importance of identifying focal nerve enlargement and hypoechogenicity proximal to the epicondylar groove. Special attention will be given to the dynamic assessment of ulnar nerve subluxation or dislocation during elbow flexion, which can lead to friction-induced neuritis. We will also examine extrinsic causes of compression, such as the anconeus epitrochlearis muscle or ganglion cysts. Furthermore, we will explore clinical strategies to distinguish peripheral ulnar neuropathy from C8 neuropathy based on specific muscle innervation.

The final technical portion addresses the Radial Nerve, focusing on its passage through the Arcade of Frohse. We will review how to clinically differentiate PIN involvement—characterized by specific finger extension weakness—from more proximal lesions that affect elbow extension. The session will conclude by reinforcing an integrative diagnostic mindset. By synthesizing specific sonographic findings with a detailed clinical history, we aim to move beyond simple observation to confirm complex differential diagnoses, ultimately elevating the diagnostic standard in musculoskeletal imaging and improving patient outcomes.