Martin-Gruber anastomoses
--median motor fibers cross over in forearm to join ulnar nerve
--stimulation of median nerve at elbow causes larger thenar CMAP amplitude than median nerve stimulation at the wrist
--stimulation of median nerve at elbow causes hypothenar or 1st DI CMAP
--stim of ulnar nerve at wrist gives a hypothenar or 1st DI DMAP amplitude that is 120% larger than CMAP evoked with ulnar stim at the elbow
--with CTS, median elbow latency is normal but median wrist latency is increased

Pronator teres syndrome
--median nerve is compressed between the superficial and deep heads of the pronator teres
--paresthesias in median distribution, ant forearm pain with pronation
--median motor or sensory slowing across forearm with normal distal latencies (same as CTS)
--EMG abnormal in median distribution (FPL, FCR, FDP, APB)

Anterior interosseous mononeuropathy
--painless weakness in FPL, FDP, and PQ)
--EMG: Limited to FPL, FDP, PQ, and median motor distal latency prolonged to PQ

Carpal Tunnel Syndrome
--sensory conduction slowing is the most sensitive test
--prolonged median motor distal latency and conduction slowing in forearm
--EMG of APB may show spontaneous activity and large, polyphasic MUAPs
--if APB is abnormal, test other C8T1 muscles to r/o radiculopathy, and prox median innervated muscles (FPL, FCR, FDP) to r/o prox median mononeuropathy
--severity of CTS measured by loss of motor and sensory CMAP amplitude
--velocity <44m/s indicates slowing across CT
--difference in sensory distal latency of more than 0.5ms betw ulnar and median indicates CTS
--decreased amplitude of SNAP and CMAP

Amyotrophic Lateral Sclerosis
--anterior horn cell loss, muscle biopsy shows denervation
--diagnosis requires EMG of several muscles, innervated by different nerves in 3 limbs or 2 limbs and cranial muscles
--diagnosis requires motor and sensory NCS in 2 limbs (must be normal sensory and normal motor or consistent with axonal loss)
--CMAP amplitudes less than 1mV
--up to 20% have mild-mod SNAP amp loss or slowing
--cold limbs → need to heat
--EMG: fibs, PSWs, late recruitment, large amp, polyphasic MUAPs, fasciculations, occ CRDs
--repetitive slow stimulation of nerves to hand muscles demonstrates abnormal decrement (20-25%) in CMAP amplitude → identical to that seen in myasthenia but smaller amp

Myasthenia Gravis
--antibodies to Ach receptors on post-synaptic membrane
--Decreased MEPP (80% of normal) and EPP amp
--repetitive nerve stimulation: slow RNS (2-5 Hz) gives decremental response (>10% drop), fast RNS (>5 Hz) has no effect due to Ca accumulation
--after isometric contraction, there is increment of initial CMAP amp → postactivation depression at 5 and 10 mins post contraction
--EMG: variable amp in single volitionally recruited MUAPs, no spont activity

Lambert-Eaton Myasthenic Syndrome (LEMS)
--antibodies to pre-synaptic voltage-gated calcium channels
--MEPP amp normal because number of Ach per quanta is normal, but fewer quanta released
--EPP amp low
--baseline CMAP amp very small (<1.5mV)
--RNS: slow RNS gives decremental response similar to in MG, fast RNS shows incrementing response
--isometric contraction shows huge increment in initial CMAP amp (>200% is diagnostic)
--EMG: marked variability in moment to moment MUAP amp, no spont activity

Botulism
--binds to presynaptic terminal, reducing number of quanta released
--very small CMAP amp
--no or minimal decremental response with slow RNS, incremental response with fast RNS
--EMG: occ spont activity
--NCS conduction velocities and distal latencies normal

Brachial Plexus Injury
--supraclavicular: flexors and extensors paralyzed
--infraclavicular: only flexors or only extensors paralyzed
--root avulsion: SNAP amp normal in a desensate digit, CMAP amp reduced
--neuropraxia: normal SNAP and CMAP amp
--plexopathies: decreased SNAP amp