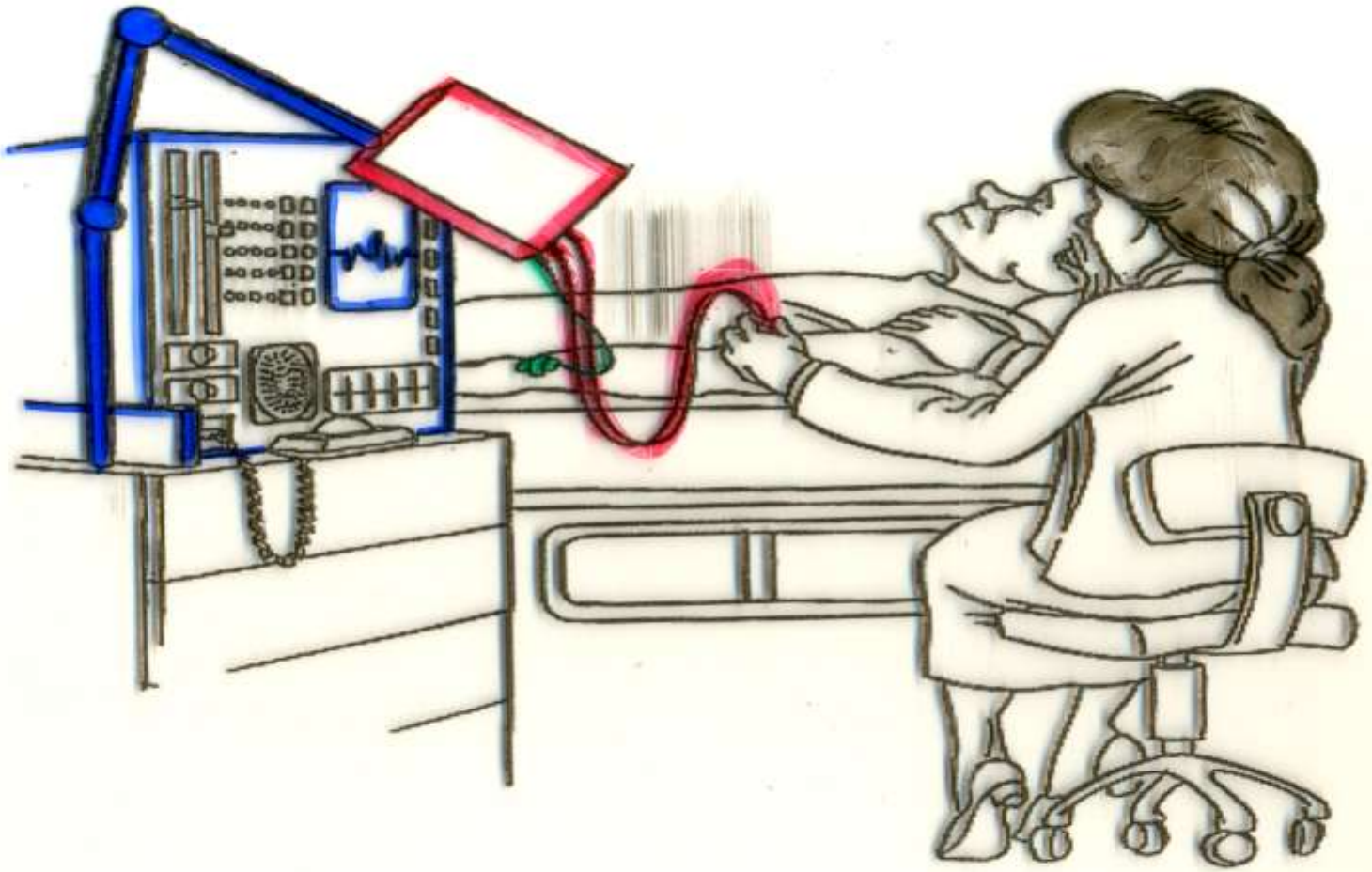
Electrodiagnostic studies



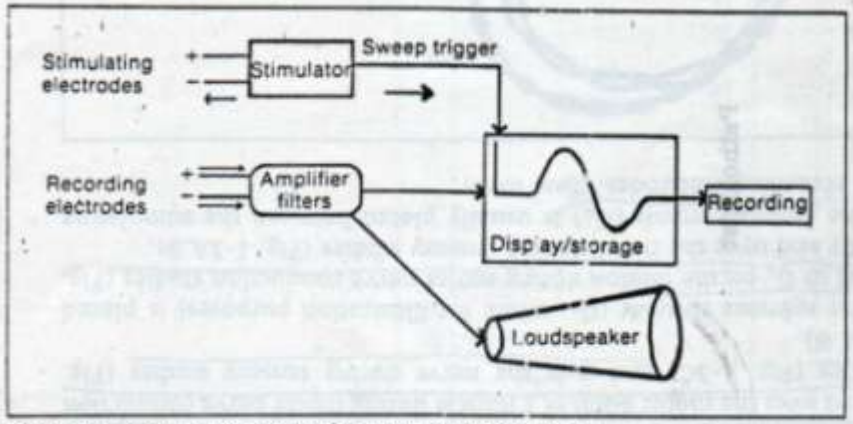
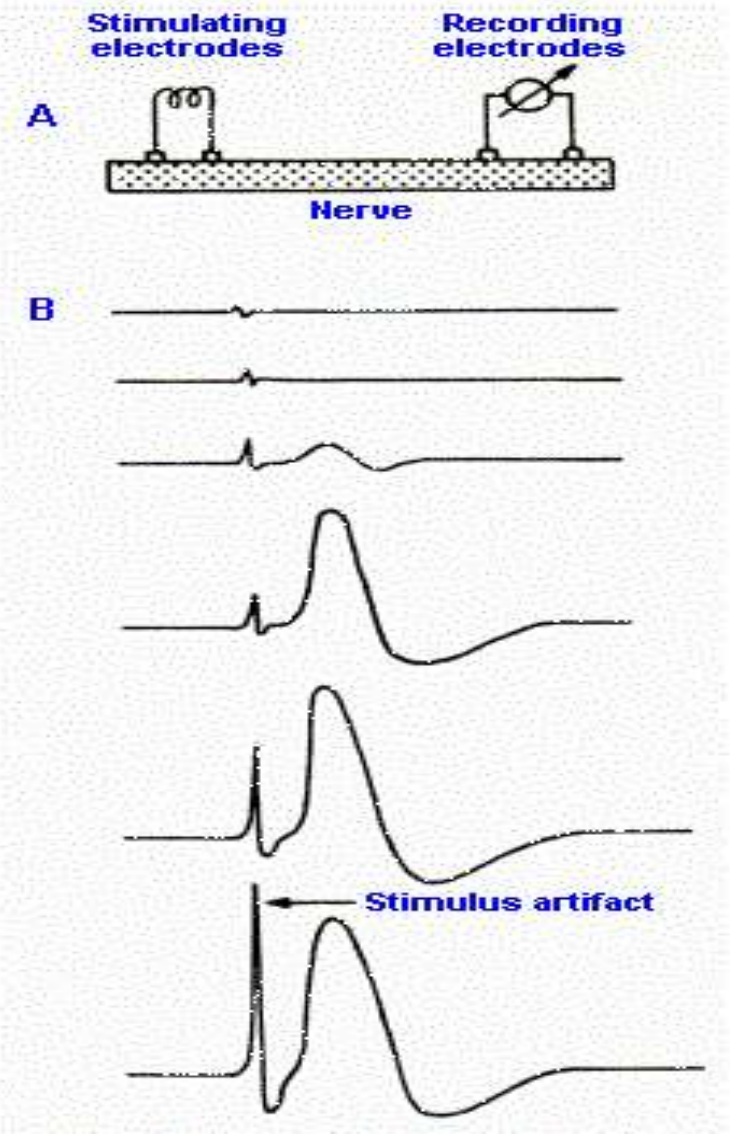
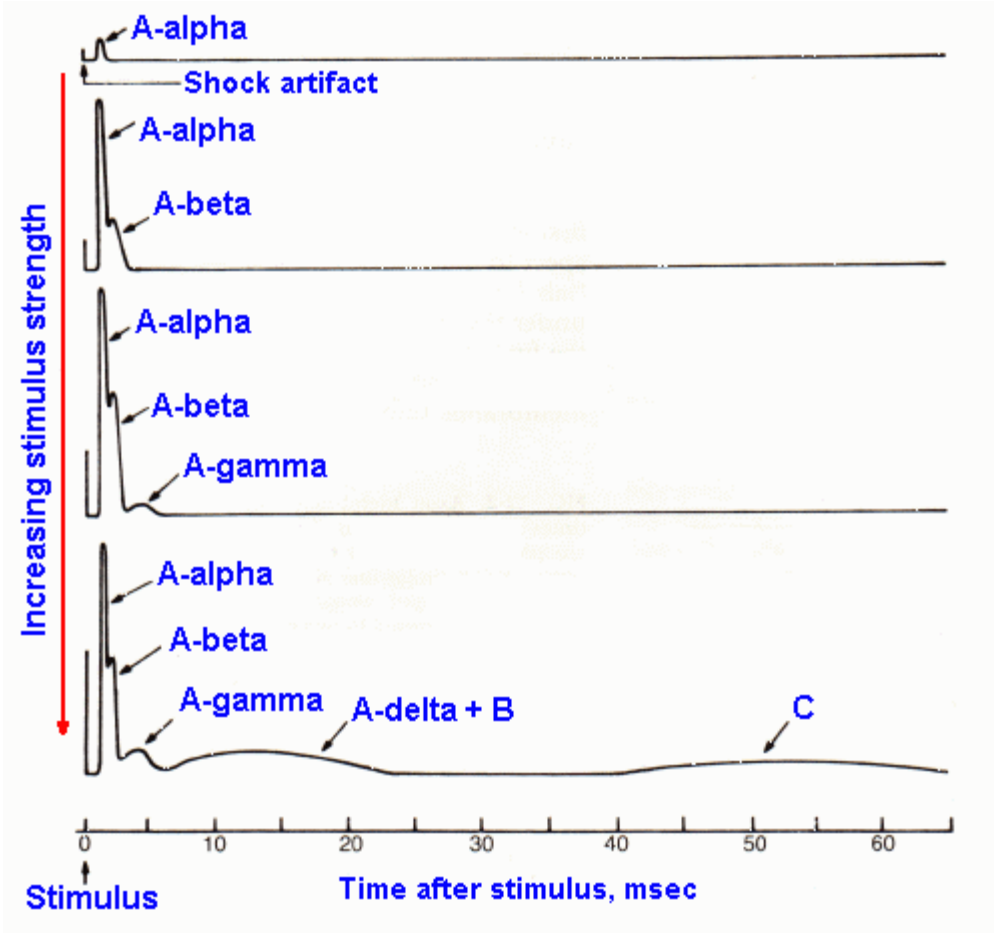


Figure 1-1. Schematic illustration of the EMG machine components.


Stimulating electrodes
Recording electrodes
A
Nerve
B
Stimulus artifact


A-alpha
Shock artifact
A-alpha
A-beta
A-alpha
A-beta
A-gamma
A-alpha
A-beta
A-gamma
A-delta + B
C
Increasing stimulus strength
0
10
20
30
40
50
60
Stimulus
Time after stimulus, msec

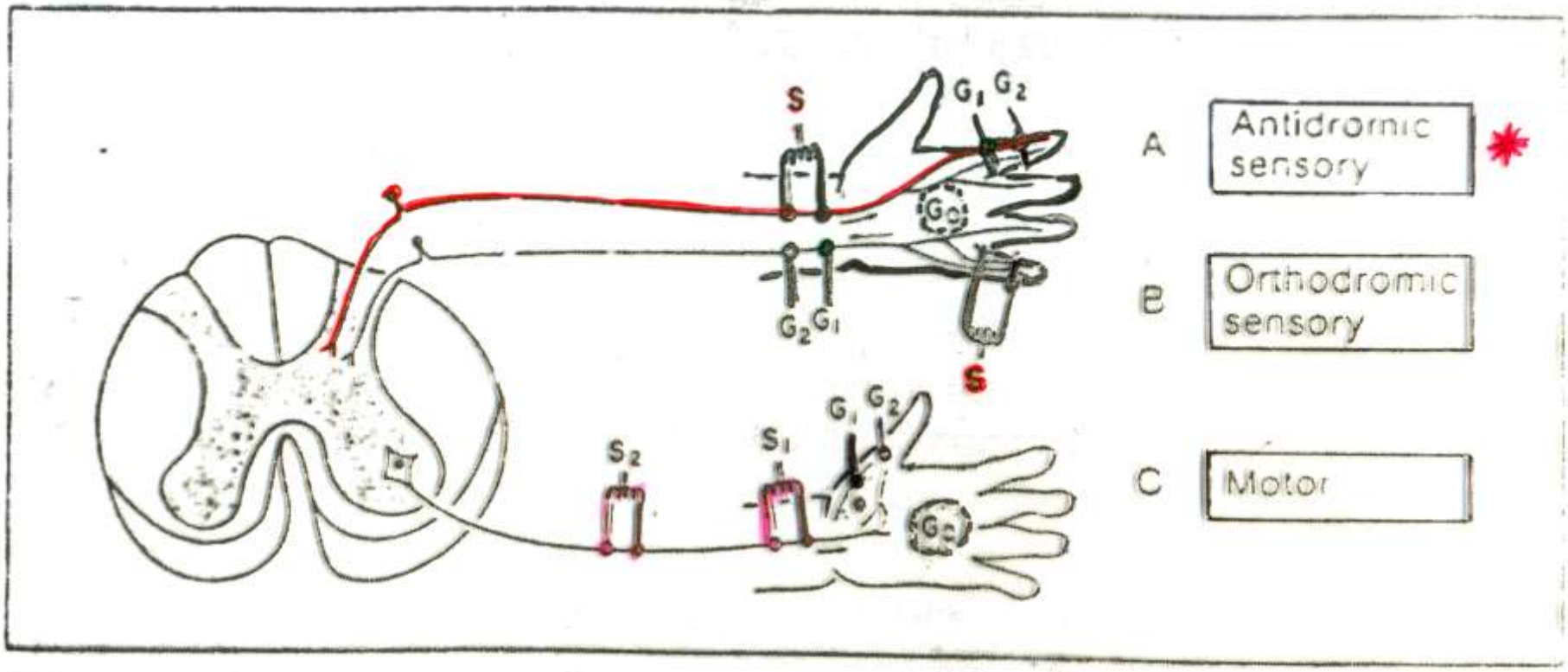


Figure 1-3. *Diagrammatic illustration of electrode placement for nerve conduction studies. Antidromic sensory study (A); orthodromic sensory study (B); and motor nerve conduction study (C). (G_1 = active recording electrode; G_2 = reference recording electrode; G_0 = ground electrode; S = stimulating electrode; S_1 = distal stimulation site; S_2 = proximal stimulation site. Cathode is black; anode is white.)*

SNAP:
Sensory Nerve Action Potential

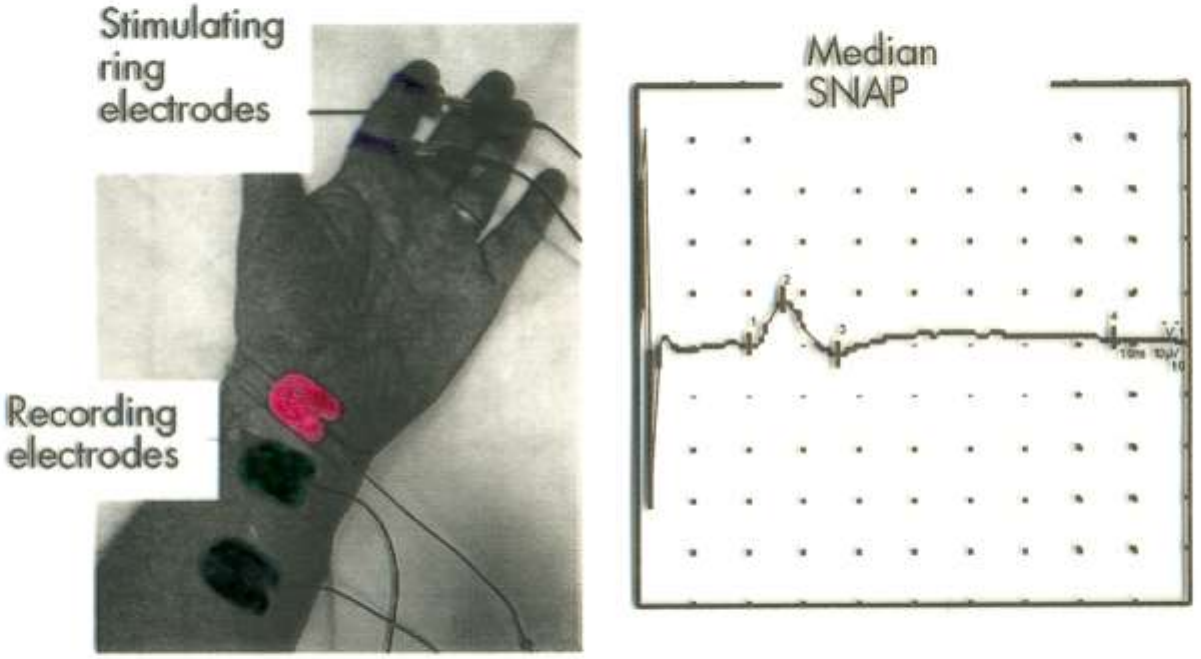
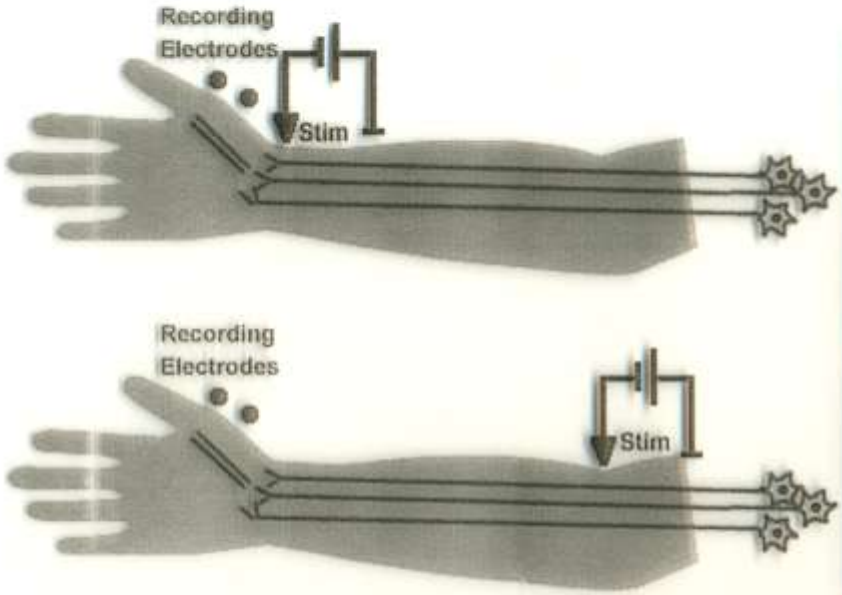


Figure 2 Median orthodromic sensory study. The index finger digital nerves are stimulated via ring electrodes and the response recorded over the median nerve at the wrist.

Mallik, A et al. J Neurol Neurosurg Psychiatry 2005;76:ii23-31ii

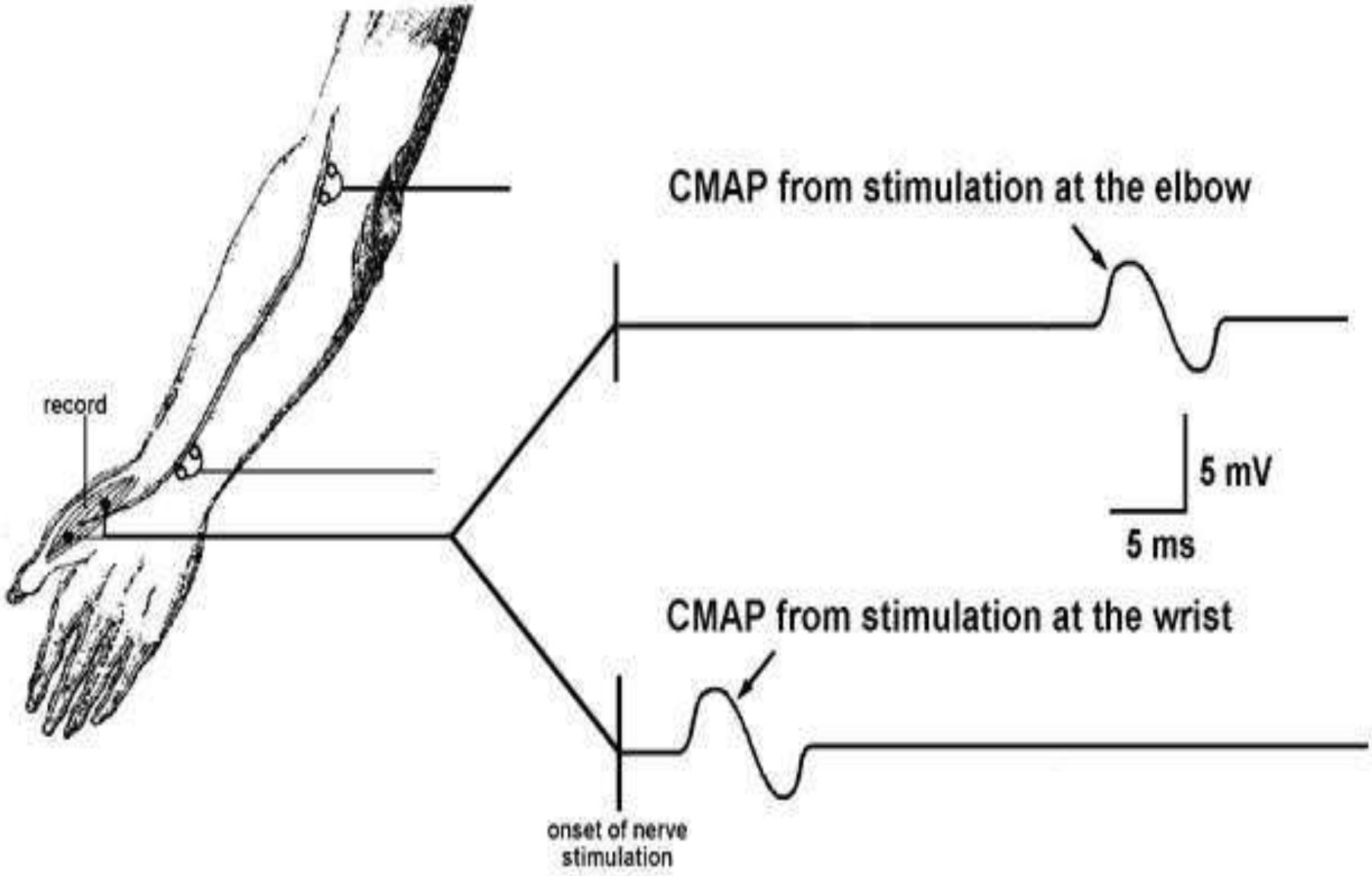
Compound Motor Action Potential: CMAP

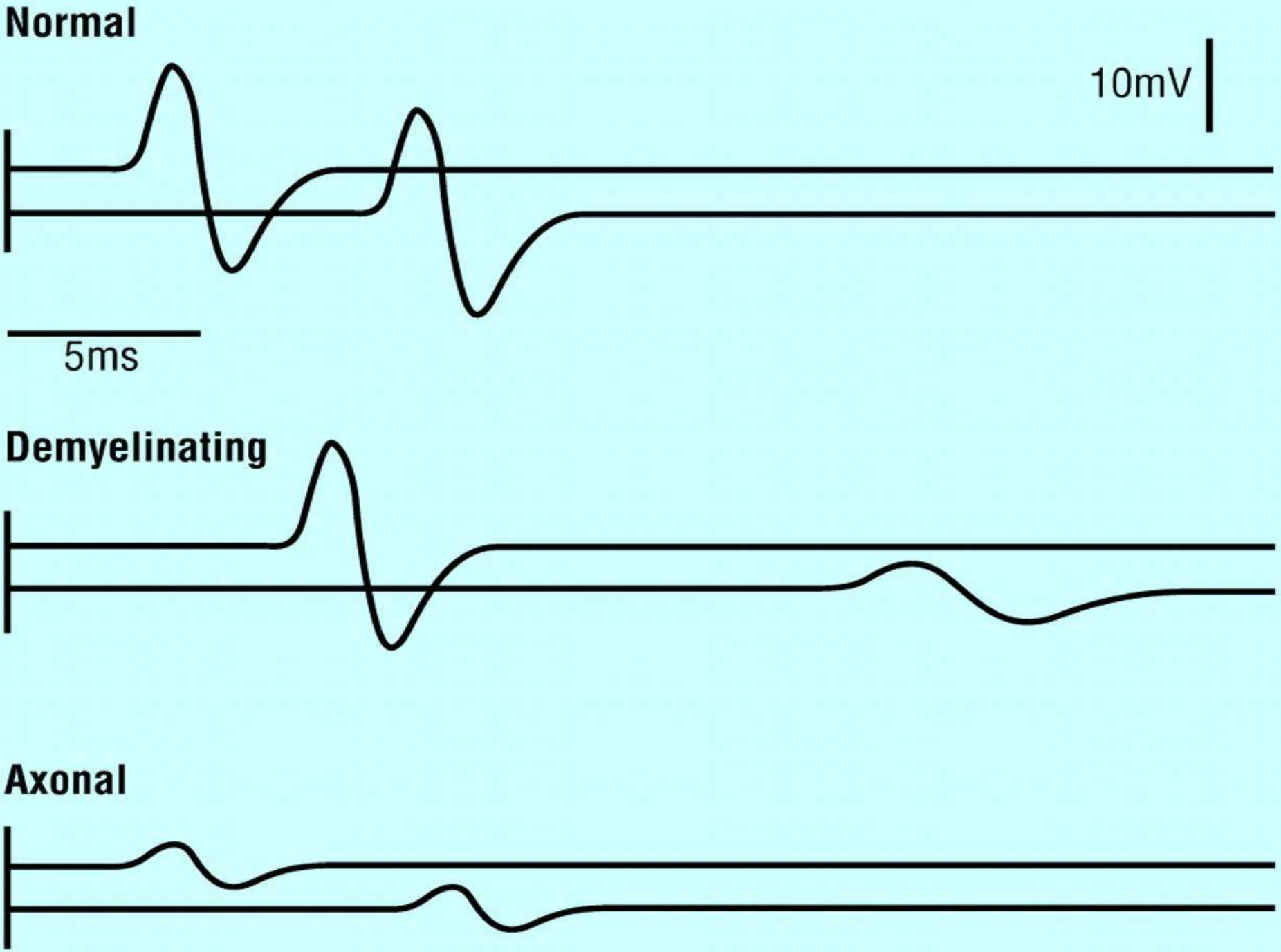


Motor nerve is stimulated and muscle response is calculated. Latency includes synaptic transmission etc. By subtracting the two latencies, the conduction velocity can be calculated.

http://www.mmi.mcgill.ca/Dev/chalk/lect72p2.htm

Median nerve stimulation at the elbow and wrist.
Recording is from the thenar muscle group.




Normal
10mV
5ms
Demyelinating
Axonal

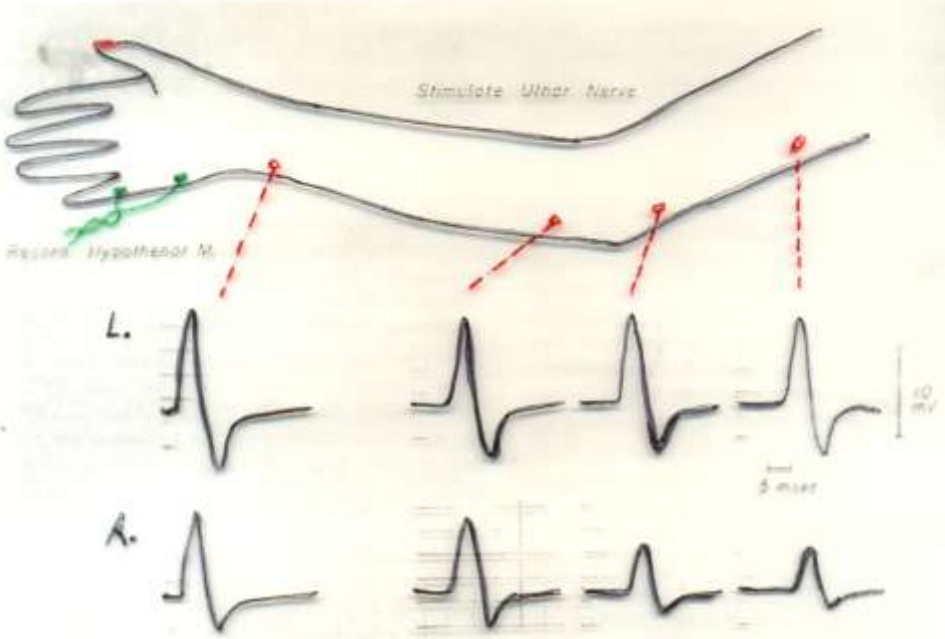


Fig. 12-28. Nerve conduction studies in patient with ulnar neuropathy at the elbow. Normal responses from left arm (L.); abnormal on right (R). There is a localized partial block of conduction (decreased amplitude above the elbow) and localized slowing of conduction velocity at the elbow. (Courtesy of E. H. Lambert, Mayo Clinic.)