

EE 4BD4 Tutorial Sept 12, 2018

For our first few tutorials we will design a diagnostic system to measure carpal tunnel syndrome, a loss of condition in the median nerve because of excessive pressure in the carpal tunnel (Figure 1). The system will consist of a stimulator presenting electrical shocks at the wrist and measurement of the resulting thumb muscle response (Figure 2). The electrical shocks will have selectable amplitude (max 100 ma) with selectable durations of 50, 100, 200, 500 μ sec. The resulting thumb muscle response will have a maximum peak to peak amplitude of 25 mv and a duration of 10 to 15 mv with a latency of 2 to 4 msec. The design will consider safety, minimum electronics and automatic measurement of latency and amplitude.

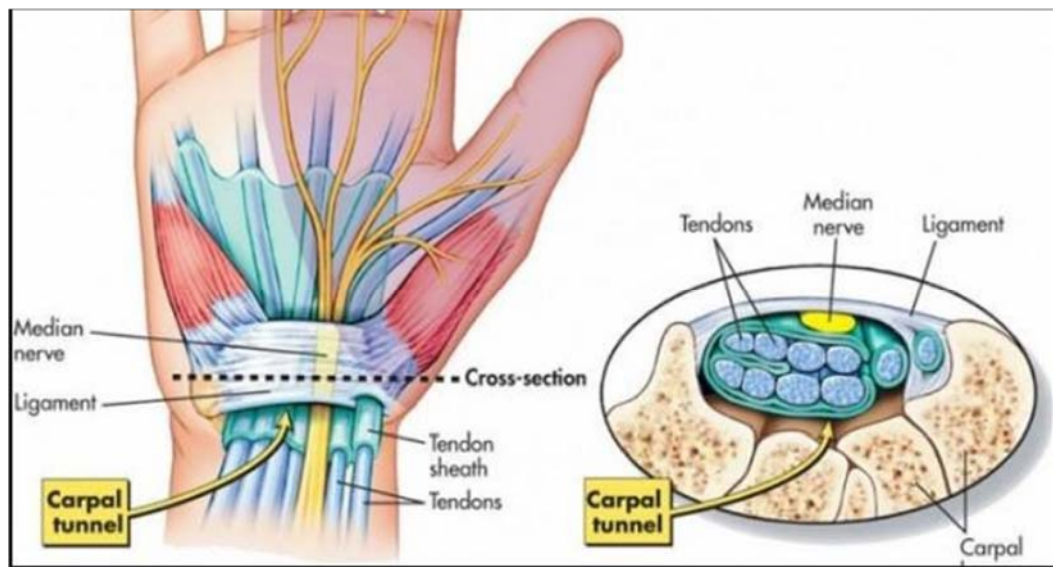


Figure 1

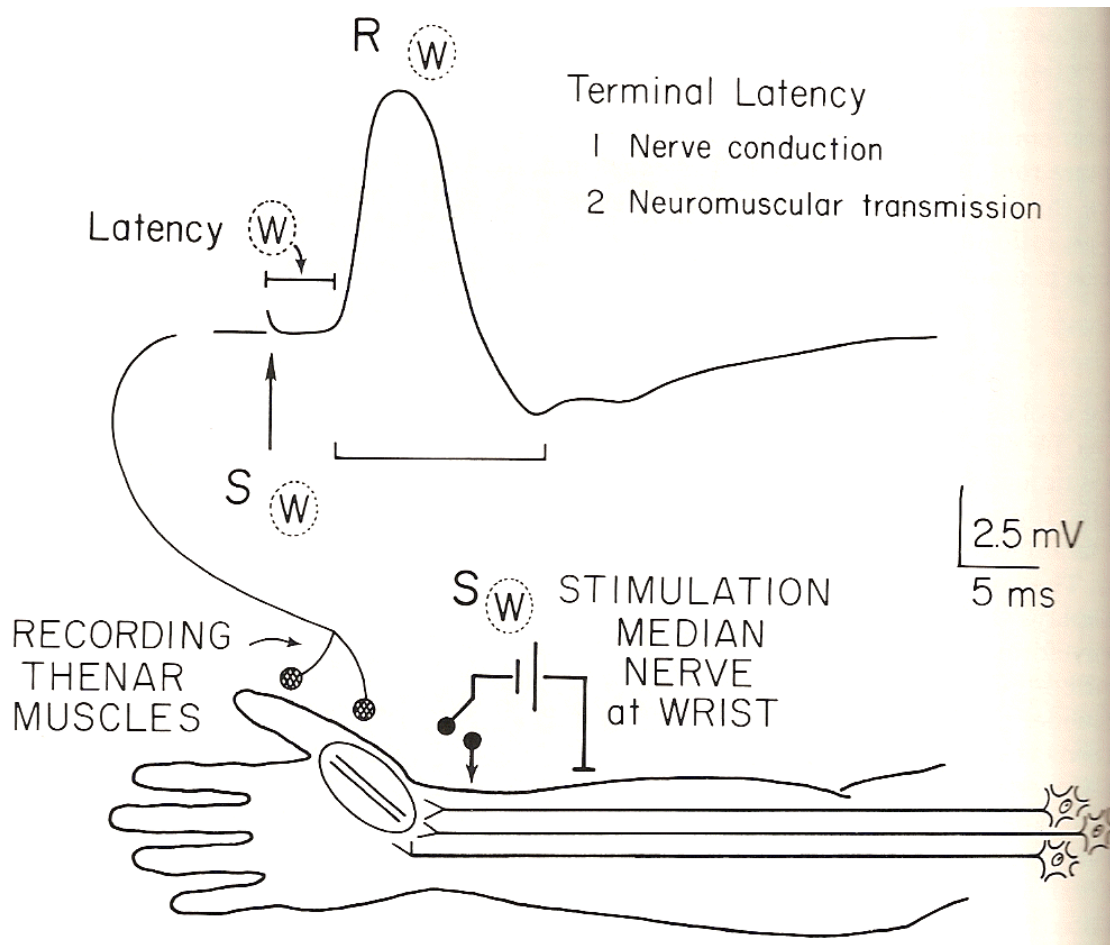


Figure 5-1

Compound muscle action potential recorded from the thenar eminence following stimulation of the median nerve at the wrist. The distal or terminal latency includes (1) nerve conduction from the stimulus point to the axon terminal; and (2) neuromuscular transmission including the time required for generation of the muscle action potential after depolarization of the end-plate.

Figure 2