- *Low pass filters and high pass filters are used to eliminate or remove the additional unwanted bio-electrical signals from the muscles nearer to the EEG electrodes.*
- *Some EEG machines have a notch filter sharply tuned at 50 Hz so as to eliminate mains frequency interference.*

WRITING PART

- *The writing part of an EEG machine is usually of the ink type direct writing recorder.*
- *The best types of pen motors used in EEG machines have a frequency response of about 90 Hz.*

CHANNELS

- *An electroencephalogram is recoded simultaneously from an array of many electrodes.*
- *The record can be made from bipolar or monopolar leads.*
- *The electrodes are connected to separate amplifiers and writing systems.*
- *Commercial EEG machines have up to 32 channels, although 8 or 16 channels are more common.*

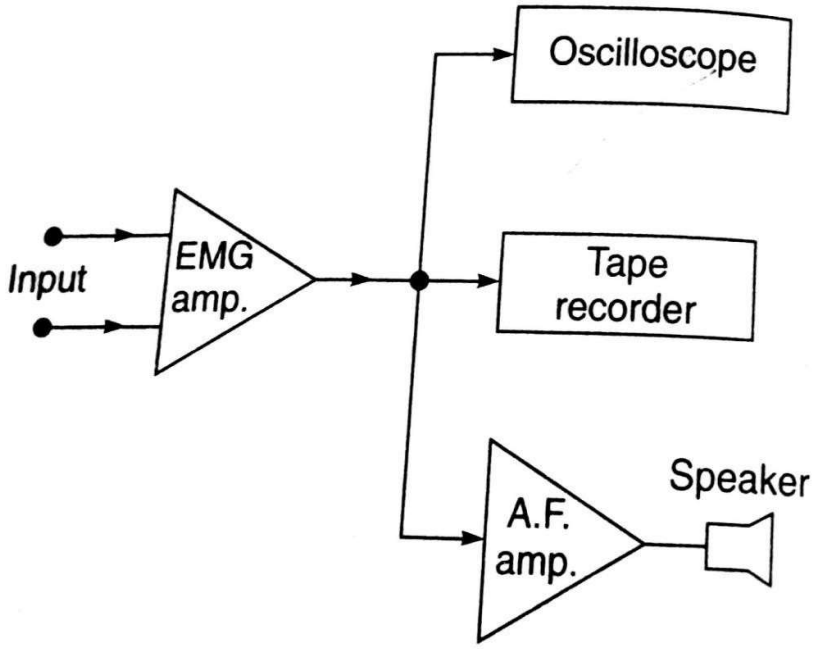
MUSCLE RESPONSE-ELECTROMYOGRAM

- *Electromyography is the science of recording and interpreting the electrical activity of muscle's action potentials.*
- *The recoding of the peripheral nerve's action potentials is called electroneurography.*
- *The electrical activity of the underlying muscle can be measured by placing surface electrodes on the skin.*
- *To record the action potentials of individual motor neurons in a muscle, the needle electrode is inserted into the muscle.*
- *Thus EMG indicates the amount of activity of a given muscle or a group of muscles.*
- *The action potentials occur both positive and negative polarities at a given pair of electrodes; so they may add or cancel each other.*
- *Thus EMG appears, very much like a random noise wave form.*
- *The contraction of a muscle produces action potentials.*
- *In a relaxed muscle, there is no action potential*

ELECTROMYOGRAM MEASUREMENTS

- *EMG is usually recorded by using surface electrodes or more often by using needle electrodes, which are inserted directly into the muscle.*
- *The surface electrode may be disposable, adhesive types.*
- *A ground electrode is necessary for providing a common reference for measurement.*
- *These electrodes pick up the potentials produced by the contracting muscle fibers.*
- *The signal can then be amplified and displayed on the screen of a cathode ray tube.*
- *It is also applied to an audio amplifier connected to a loudspeaker.*

- *A trained EMG interpreter can diagnose various muscular disorders by listening to the sounds produced when the muscle potentials are fed to the loudspeaker.*



- *The block diagram shows a typical setup for EMG recordings.*
- *The oscilloscope displays EMG waveforms.*
- *The tape recorder is included in the system to facilitate playback and study of the EMG sound waveforms at a later convenient time.*
- *The waveform can also be photographed from the CRT screen by using a synchronized camera.*
- *The amplitude of the EMG signals depends upon various factors, such as type and placement of electrodes used and the degree of muscular exertions*

NERVE CONDUCTION VELOCITY MEASUREMENTS

- *The measurement of conduction velocity in motor nerves is used to indicate the location and type of the nerve damages.*
- *Here the nerve function is examined directly at the various segments of the nerve by means of stimulating it with a brief electric shock having pulse duration of 0.2 to 0.5 milliseconds and measuring the latencies, we can calculate the conduction velocity in that nerve.*
- *Latency is defined as the elapsed time between the stimulating impulse and the muscle's action potential.*

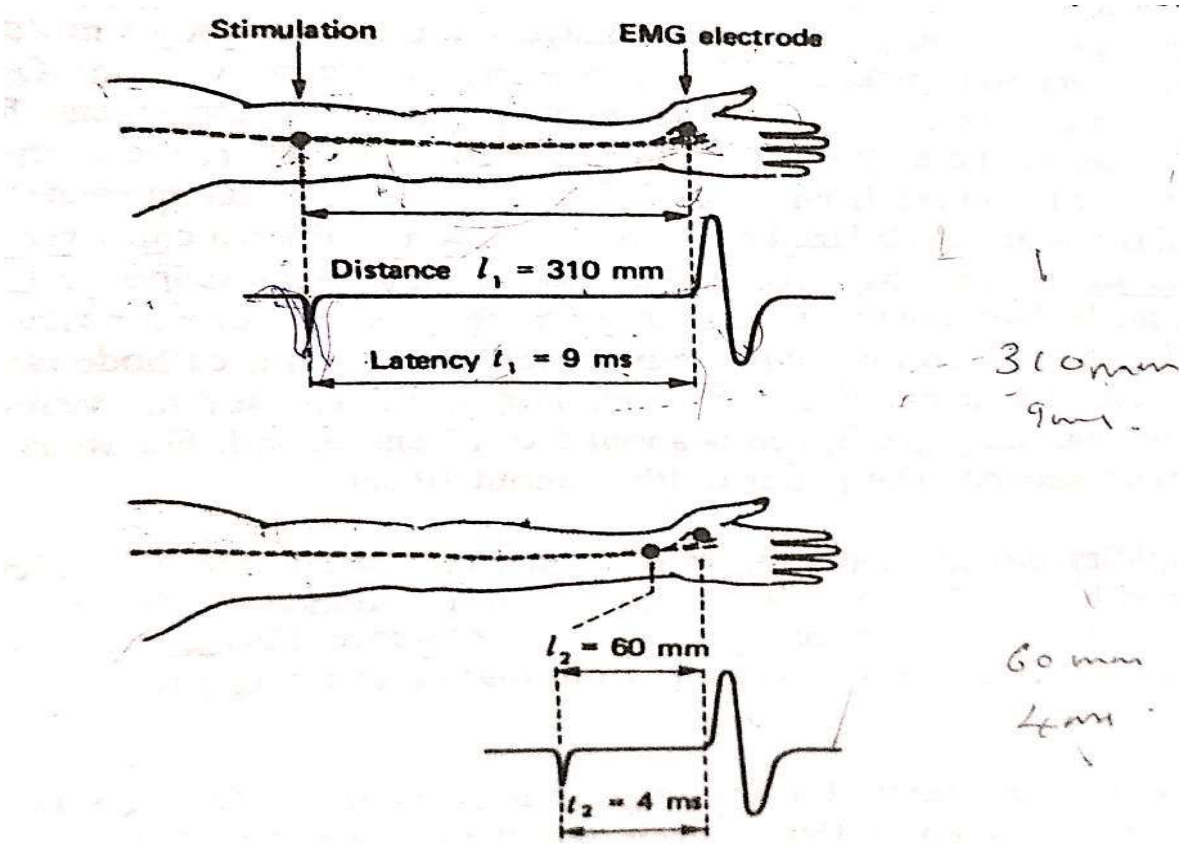


Fig.4.28. Determination of conduction velocity in a motor nerve

- *Figure illustrates the measurement procedure.*
- *The EMG electrode and the stimulating electrode are placed at two points on the skin, separated by a known distance l_1.*
- *A brief electrical pulse is applied through the stimulating electrode. When the excitation reaches the muscle, this contracts with a short twitch.*
- *Since all nerve fibers are stimulated at the same time and the conduction velocity is normally the same in all nerve fibers, there is synchronous activation of the muscle fiber.*
- *This action potential of the muscle is picked up by the EMG electrode and is displayed on the oscilloscope along with the stimulating impulse.*
- *The elapsed time t1 (latency) between the stimulating impulse and muscle's action potential is measured.*
- *Now the two electrodes are repositioned with the distance of separation as l2 meters. The latency is now measured as t2 seconds.*
- *The conduction velocity, v*

- **RESPIRATORY PARAMETERS**