A Comparative Study Of Nerve Conduction Velocity Between Left And Right Handed Subjects

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Abstract: Background & Objectives: Nerve conduction velocity is being used as a widespread measure of diagnosis of nerve function abnormalities. Dependence of nerve conduction parameters on intrinsic factors like age and sex, as well as extrinsic factors like temperature is well known. Lateralization of various cerebral functions like speech, language, visuospatial relations, analysis of face, recognition of musical themes and use of hand for fine motor movements have also been studied. Some differences have been noted between left and right hander for nerve conduction. The aim of this study is to compare the nerve conduction velocity between left handed and right handed subjects using median nerve and find out whether there is any difference in nerve conduction velocity (motor or sensory) with handedness. **Method:** The study was carried out in students of B J Medical College by the use of standard 2 channel physiograph. Comparison of motor and sensory nerve conduction velocity between left and right handed subjects was done under paired-t test. **Results:** Hemispheric specialization is primarily responsible for difference of dexterity. Some skills like music, sports activities are also due to hemispheric difference. On comparison of nerve conduction velocity between left and right handed persons the study shows that there is significant difference in sensory nerve conduction velocity between left and right handed subjects. **Interpretation & Conclusion:** From the results we can conclude that there should be different set of standards for sensory nerve conduction velocity of left and right handed subjects.

Keywords: handedness, nerve conduction velocity, median nerve

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Introduction: Nerve conduction study has emerged as a major tool for diagnosis of nerve function disorders. Handedness (also referred to as chirality or laterality) is a human attribute defined by unequal distribution of fine motor skills between the left and right hands[1]. Intrinsic factors like age and sex, as well as extrinsic factors like temperature on nerve conduction are well known. Various cerebral functions like speech, language, visuospatial relations, analysis of face, and recognition of musical themes and use of hand for fine motor movements have also been studied with lateralization. However, the spatial talents of left handed persons may be well above average; a disproportionately large number of artists, musicians and mathematicians are left handed. Learning disabilities like dyslexia are 12 times common in left handed persons than in right handed persons.[2] Variation in nerve conduction with lateralization is also expected.

Currently same References data is used for nerve conduction velocity between left and right handed persons.[3] Normal value range is necessary for comparison in left hander. Here we have compared sensory as well as motor nerve conduction velocity between left (n=25) and right (n=25) handed medical students.

Material and Method: Selection of subjects was done from 50 male healthy, non obese medical students with age group of 17 to 30 years. 25 were left handed and the remaining 25 were right handed normal subjects. The study was done under ethical standard of institution with permission of ethical committee. Dexterity is defined by fine motor skills and the strength. Ambidextrous as well as those students having any sign of nerve or muscle disorders (pain, tingling, numbness, muscle weakness), metabolic disorders, peripheral nerve injury were excluded from the study.[4]

Tools for testing and procedure: A standard 2 channel physiograph having RMS EMG EPMK II one of latest software in the study of nerve conduction was used for measurement. Subjects were acclimatized to standard room temperature for 10 minutes. After that the procedure was performed under following settings, for sensory nerve conduction Gain/sensitivity: 1-5µV/mm, Sweep speed: 1-2 ms/mm, Filter: 5-10 Hz (low frequency), 2-3 KHz. (High frequency) and for motor nerve conduction sensitivity: 2-5mV/mm, Sweep speed: 2-5ms/mm, Filter: 2-5 Hz (low frequency), 10 KHz (High frequency). Stimulation technique was as per institutional criteria with

supra maximal technique for motor studies. Distances were measured by a standard measure tap.

Parameters studied: Sensory and motor nerve conduction velocity of median nerves of both sides for left and right handed subjects. Latency of response was measured from time interval between stimulus artefact and onset of electrical response. Then, nerve conduction velocity was calculated by dividing the distance between two stimuli with their latency difference.

Analysis: Results were presented in terms of mean +/- SD. Unpaired-t Test was used for comparison of two groups. P value less than 0.05 was considered as significant.

Results and Discussion: Sensory nerve conduction velocity was noted significantly higher in left handed subjects as compared to right handed subjects (P value <0.01). But on the contrary motor nerve conduction velocity does not significantly differ between left and right handed subjects. The comparison between left and right hand of individual left or right handed subjects subject shows there is no significant difference between two hands in a same person (P value >0.05).

Handedness is primarily found to be due to difference in presentation of cerebral hemispheres. Genetic and heredity theory is quite successful in explaining the difference.[5] Lateralization of hemispheres is proposed as main factor for the difference in nerve conduction in 2007, researchers discovered that specific alleles of at least one of three single polynucleotide polymorphism upstream of the already known LRRTM gene were linked to left-handedness.[6] This gene may be responsible for the difference in nerve conduction. Study of effect of peripheral factors on handedness was studied widely by various researchers. . Apart from genetic factors, some peripheral factors (biological[7] and environmental[8]) may be involved. Here, we have noted that left handed persons have significantly faster conduction in sensory nerves than right handed counter parts. Tan U[9] and Bromberg MB[10] noted asymmetry of nerve conduction velocity in their studies. Navin Gupta[11] also found asymmetry in sensory nerve conduction between left handed and right handed subjects. Tayade M C, Latti R G[12] also found some variation between left and right handed individuals. The difference is due to different presentation of categorical and representational hemispheres with dexterity whether left or right. The difference is to be taken into consideration and new limits for nerve conduction velocity are to be studied further for left hander individuals. On the contrary a very few studies also noted symmetry in nerve conduction except Median and Ulnar nerve (Bromberg MB).

Table: Motor and sensory nerve conduction velocities of left and right handed subjects

Parameters	Left handed	Right handed
Sensory NCV		
Left median nerve	64.63±2.67	61.37±2.74
Right median nerve	64.31±2.56	60.43±3.56
Motor NCV		
Left median nerve	61.74±2.21	63.38±3.21
Right median nerve	62.17±2.21	63.02±2.48

Conclusion: Here we can conclude that there may be significant difference in sensory nerve conduction velocity between left handed and right handed persons. While motor nerve conduction velocity does not significantly change with dexterity. So, there should be different range of values for sensory nerve conduction velocity for left and right handed persons.

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