

To Study Nerve Conduction Velocity of Median Nerve in Mobile Phone Users-A Cross Sectional Study

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Abstract: In recent few years, the extensive use of mobile phones raises the question of possible health effects, particular on neural functions. A variety of studies show beyond the shadow of doubt that cell phone exposure alters nerve function in an adverse way, the problem that certainly increases based on exposure time and frequency of use. Data indicates that this problem will be worse in presence of other nerve related stress and risks can be reduced by having adequate antioxidants. **Objective:** The purpose of this study to find out the effect of mobile phone usage on NCV of median nerve. **Population:** This study had conducted with 69 number of mobile phone using subjects from AIMS Physiotherapy College and L G Hospital, Ahmedabad. **Intervention:** The participants were randomly allocated to 2 groups: Group 1(n = 38): mobile use < 2 hours and Group 2(n = 31): mobile use 2 to 4 hours. **Measurements:** motor and sensory nerve conduction velocities are measured in both the groups. **Results:** There is correlation between SNCV and mobile using time. When the time of mobile phone increases, the SNCV decreases by using Pearson test. **Limitations:** small study group and no retrospective measurement were possible. **Conclusion:** there is correlation between SNCV and mobile using time. When the time of mobile phone increases, the SNCV decreases. [Nirali P NJIRM 2017; 8(3):22-25]

Key words: NCV- Nerve Conduction Velocity, MNCV- Motor Nerve Conduction Velocity, SNCV- Sensory Nerve Conduction Velocity, CTS – carpal tunnel syndrome, CTD- cumulative trauma disorder, RSI- repetitive stress injury

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Introduction: Modern communication devices such as mobile phones are associated with several painful repetitive stress and nerve compression injuries. Nerves are damaged by repeated use of thumb movements. Tingling feelings are caused by the compression of nerves. So NCV can be used to detect conditions whereby nerves are affected by mechanical compression injury. A decrease speed of transmission indicates nerve disease or abnormal pressure on the nerve.

Aim and Objectives:

1. To find out the effect of mobile phone usage on NCV of median nerve.
2. To compare the median nerve velocity between >2 hours using mobile phones and 2-4hours using mobile phones.
3. To compare the median nerve velocity with the normal mean value.
4. To correlate the median nerve velocity with mobile phone usage time.

Methods:

Study design: Methods: This study had conducted with 69 no of mobile phone using subjects from AIMS Physiotherapy College and L G Hospital, Ahmedabad; who received an explanation of the study contents & agreed to participate with consent form. The ethical

approval for the study was obtained from the ethical committee.

- Pre procedure assessment of the patient including history, general examination, systemic examination with all required investigations will be done. Informed and written consent will be taken and baseline vitals will be recorded.
- The software used for this experiment is RMS EMG EPMK II, it is one of the latest software with facilities for nerve conduction velocity.

Inclusion criteria:

1. Both the sexes between age group 18 to 25 years were taken
2. Subjects were using mobile phones for continuous chat conversation and holding cell phones for prolonged period of time (30 minutes to 4 hours), one handed method
3. Subjects who are using their right hand for operation of mobile phones
4. Subjects who are using mobile phones since last 6 months

Exclusion criteria:

1. History of diseases in the muscles and nervous system
2. History of any injuries, fractures or pain in the wrist area

3. Diabetic patient
4. Pregnant females
5. History of tobacco or alcohol consumption
6. History of coronary heart diseases
7. History of seizures, neuropathy, neuromuscular junction disorders and muscle disorders
8. History of Leprosy , arthritis
9. History of tremors, ataxia, muscle weakness, wasting of muscles
10. Subject on any medication
11. Presence of hypotension, valvular heart disease, pregnancy or airway obstruction
12. History of diabetes for more than 5 years
13. Presence of abnormal sensation like tingling, numbness, pain in the limbs or burning sensation
14. history of injury to upper limbs, spinal cord, brain
15. Presence of abnormal sensations over limbs like tingling, numbness, pain in the limbs, burning sensations
16. History of familial neuromuscular disorders

MNCV of Median nerve:

- Site of stimulation- Wrist – 8 cm away from active electrode
- Elbow – proximal to elbow crease, medial to Biceps tendon exactly from where the muscle tapers

Figure 1: Site of recording- Abductor pollicisbrevis



SNCV of Median nerve: Site of stimulation- Wrist – 14 cm away from recording electrodes

Figure 2: Site of recording-index finger



Statistical analysis: The comparison between normal mean value of median nerve MNCV (Kimura) and group-1, group-2 by using one sample t test. And p value is 0.19 showing no statistical significant.

Group 1: mobile use < 2 hours

Group 2: mobile use 2 to 4 hours

Table-1 Comparison of the study group with MNCV mean value (57.7) (Kimura)

Group	Number	Mean	SD	p value
<2 hours	38	58.40	3.24	0.19
2 – 4 hours	31	58.80	4,60	

Comparison between normal mean value of median nerve SNCV (Kimura) and group-1, group-2 by using one sample t test. And p value is showing statistical significant.

Table-2 Comparison of the study group with SNCV mean value (56.2) (Kimura)

Group	Number	Mean	SD	p value
<2 hours	38	51.68	0.26	0.005
2 – 4 hours	31	48.95	2.82	0.004

Comparison between group-1 and group-2 was done by using T-test. There was no statistically difference between group-1 and group-2.

Table-3 Distribution of the study subjects based on MNCV

Group	Number	Mean	SD	p value
<2 hours	38	58.40	3.24	0.67
2 – 4 hours	31	58.80	4,60	

Comparison between group-1 and group-2 was done by using T-test. There was no statistically difference between group-1 and group-2

Table-4 Distribution of the study subjects based on SNCV

Group	Number	Mean	SD	p value
<2 hours	38	51.68	9.26	0.309
2 – 4 hours	31	48.95	12.82	

Correlation between mobile usage (minutes) and MNCV, Pearson correlation value is 0.042 which is positive showing there is no correlation between mobile usage and MNCV.

Table-5 Distribution of the study subjects based on correlation value (MNCV)

	Mean	SD	Person co value
Minutes	106.09	76.50	0.042
MNCV	58.58	3.89	

Correlation between mobile usage (minutes) and SNCV, Pearson correlation value is -0.206 which is negative showing there is correlation between mobile usage and SNCV.

Table-6 Distribution of the study subjects based on correlation value (SNVC)

	Mean	SD	Person co value
Minutes	106.09	76.50	-0.206
MNCV	50.46	11.01	

Result: There is no correlation between MNCV and mobile using time. There is correlation between SNCV and mobile using time. When the time of mobile phone increases, the SNCV decreases by using Pearson test. There is no statistical significance of MNCV and SNCV between group-<2 hours and group-2 to 4 by using t test. Comparison between normal mean value (Kimura) and two groups alternately, there is reduction of SNCV values but there is no reduction of MNCV values.

Conclusion: In present study concluded that there is correlation between SNCV and mobile using time. When the time of mobile phone increases, the SNCV decreases. There is no correlation between MNCV and mobile using time. According to mean value of Kimura there is reduction of SNCV values but there is no reduction of MNCV values.

There are chances of CTS, CTD and RSI in future who are continues hold/typing work on mobile phones for prolong period of time.

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