Correlation of Nerve Conduction Studies to the Anthropometric Measurements of the Hand and to the Clinical Severity of Carpal Tunnel Syndrome

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ABSTRACT

The purpose of this work was to study the degree of accordance between the clinical classification and nerve conduction classification. Also to study the relationship of some suggested risk factors like body mass index (BMI), wrist ratio (WR), and wrist-palm ratio (WPR) to the development of CTS and to the severity of nerve conduction abnormalities in such condition. Clinical assessment and classification for the patient group were done based on the symptoms and signs. According to the clinical classification, patients were classified into 3 groups: mild, moderate and severe. According to nerve conduction classification, the patients were divided into 4 groups: patients with normal conduction, patients with mild conduction abnormality, moderate conduction abnormality, severe conduction abnormality.

Conclusions: The degree of accordance between the clinical and nerve conduction classification was 52% (discordance = 48%). That increases with the increase in clinical severity. There were statistically significant differences in BMI, WR, and WPR between the healthy and the patient groups. It is also confirmed that increased wrist ratio, wrist-palm ratio, and body mass index are important personal factors that increase the probability of occurrence of the disease and can affect the severity of the condition in carpal tunnel syndrome. (Egypt J. Neurol. Psychiat. Neurosurg., 2009, 46(1): 67-77)

INTRODUCTION

Since the 1950s, the forearm electrodiagnostic studies have got a significant role in the diagnosis of peripheral nerve injuries involving the upper extremity. Boniface et al. reported that electrodiagnostic studies are especially important in the characterization of entrapment neuropathy such as carpal tunnel syndrome (CTS). In 1993, the American academy of electrodiagnostic medicine (AAEM) stated that clinical diagnosis of CTS can only be validated by a complete electrophysiological study. The test shows high degree of sensitivity and specificity that allows grading of neurologic impairment. Diagnosis of CTS is often confirmed by nerve conduction studies. However normal nerve conduction in the presence of the clinical symptoms or signs of the disease does not exclude the presence of the disease. Based on the electrophysiological studies, the severity of median nerve damage in CTS can be judged by the amount of slowing and amplitude reduction of the sensory and motor action potentials of the median nerve. Correlation between the clinical presentation and the nerve conduction grading has seldom been clearly reported. Some of the personal risk factors are female gender, age, obesity, higher wrist ratio (wrist depth to wrist width > 0.7), and small sized hands which are indicated in some studies by what is called wrist-palm ratio.

Aim of the work

This study aims to show the correlation between the clinical classification based on the symptoms and signs of the disease and between the electrophysiological classification based on the abnormalities in the median nerve sensory and motor action potentials. Also to determine the role of the body mass index, wrist ratio and wrist-palm ratio in the development of CTS as well as their relationship to the severity of nerve conduction abnormalities in an age-matched female gender prospective study.
Epidemiology

Carpal tunnel syndrome has now become one of the most frequently entertained musculoskeletal diagnoses. In the United States, the prevalence of CTS estimated from a regional health care system was 3.7% of the general population. It is three times as common in women as in men, and it usually occurs in the 40 to 60 year age group. In our locality, a study was made to estimate the prevalence of CTS in Upper Egypt and the other types of peripheral neuropathies. This study revealed that CTS had a prevalence rate of about 1686/100,000 with a female to male ratio of 10 /1. Many researchers consider CTS as one of the cumulative trauma disorders. English et al demonstrated CTS to be the most common disorder present in 580 occupational injuries. Also, it was reported that CTS occurred in 64% and 75% of garment and hospital workers respectively. It has also been noted in rock driller, cashiers, secretaries, housewives, sheet metal worker and others. There are a myriad of purposed causes for CTS including high force, high-repetition jobs, prolonged postures and vibration.

Risk factors

Many physical factors such as repetitive stress, repetitive bending or twisting of the hand and wrist at work and the use of vibrating tools have been noted as occupational risk factors. Personal risk factors associated with CTS are female gender, age, pregnancy and various medical conditions including thyroid disorders, acromegaly, diabetes, and familial predisposition. Despite some contradicting data, obesity, square shaped wrist and hand have been identified as individual risk factors associated with increased risk for development of CTS in the last 2 decades. Deckel et al. (1980) in a comprehensive study identified a recent increase in body weight as a possible risk factor. Subsequently, Vessey et al (1990), in another study over female CTS patients, found a statistically significant relationship between body mass index (BMI) and the first consultation for CTS. Other study concluded that increased BMI increases the risk for bilateral CTS. Also it was reported that obese persons have twice the risk for developing CTS than non-obese persons. The risk was estimated as 8% for each one unit increase in BMI.

Johnson et al. (1983) first described a correlation between wrist ratio (WR, wrist depth divided by wrist width) and CTS. Their observation suggested a critical WR > 0.7 to be the ratio at which distal sensory latency reach the higher level of normal. Other researchers had emphasized the observation of Johnson. Others recommended wrist measurement as part of the physical examination in CTS. Some, however, found only a weak association between WR and development of CTS or prolongation of the distal sensory latency. Several studies recommended that WR is an important risk factor for development of CTS. Moreover, it was found that WR also may affect the severity of nerve conduction abnormalities found in CTS patients. They also studied a new ratio; wrist-palm ratio (obtained by dividing the depth of the wrist by the length of the palm) to be another risk factor for CTS that may also affect the severity of the condition.

SUBJECTS AND METHODS

A prospective study included 110 hands of 65 carpal tunnel syndrome (CTS) female patients and 50 control female subjects who presented to the neurophysiological laboratory in Sohag Faculty of Medicine in the period from July 2005 to March 2006. The study was carried out on females because CTS in our locality is mainly prevalent in females. Selection of population study and methods of testing were designed according to the following policy:

1. Carpal tunnel syndrome subjects

This study included 65 CTS female patients with a mean age of 36.4. Patients were included in the study when they met the following diagnostic criteria suggested by Padua et al.:

1. **Subjective history:** history of paresthesia and/or pain either only nocturnal or diurnal and nocturnal in the median nerve distribution, numbness and falling of objects out of the patients' hand.
2. **Objective criteria:** positive Phalen and/or Tinel test, median nerve sensory deficit (through detection of hypoesthesia in fingers),
and/or motor deficits (examination of thumb abduction and opposition), and atrophy of the median innervated thenar muscles.

Patients with generalized neuropathy, cervical radiculopathy, previous carpal tunnel surgery or inflammatory wrist joint disease were excluded from the study.

Patients were classified according to clinical evaluation into 3 groups:
- **Mild CTS**: Isolated subjective symptoms and normal clinical examination.
- **Moderate CTS**: There is an objective sensory deficit (hyposthesia) in the distribution of the median nerve without motor deficits.
- **Severe CTS**: Objective sensory and motor deficits (weakness of thumb abduction or opposition) in the distribution of the median nerve with or without thenar atrophy.

On the electrophysiological bases, patients were also classified into 3 groups using a modified nerve conduction classification proposed by Stevens:
- **Mild CTS**: Prolonged distal sensory latency (DSL) with or without sensory nerve action potential (SNAP) amplitude reduction.
- **Moderate CTS**: Abnormal median sensory latency and prolongation of median distal motor latency (DML).
- **Severe CTS**: Prolonged median motor and sensory distal latencies, with either an absence of SNAP, or low amplitude or absent thenar compound muscle action potential (CMAP).

Some cases have a clinical presentation which is strongly suggestive for CTS but with normal nerve conduction. Such cases also were included in the study and were classified as CTS with normal nerve conduction.

(2) **Control subjects**

A number of 50 asymptomatic age-matched female persons were included in the study. Their ages range from 17 to 58 with a mean age of 32.8. Those persons were selected according to:

- Normal neurological examination.
- No history of peripheral neuropathy, myopathy, or wrist deformities
- No family history of neuromuscular diseases.

**For these persons the following measurements were performed:**
- Sensory and motor nerve conduction studies of the median nerve to obtain reference values for the healthy subjects.
- Body mass index (BMI), wrist ratio (WR), and wrist-palm ratio (WPR).

3) **Anthropometric measurements**

The following measurements were taken for all persons included in this study:

A) **The body mass index:**

It is a general indicator of the body fat content. It was calculated by dividing the body weight in kilograms by the squared height in meters.

B) **Wrist ratio:**

Obtained by dividing the anteroposterior dimension of the wrist (wrist depth) by its mediolateral dimension (wrist width) as shown in figures (1) and (2). These measurements were taken using a standard engineering caliper shown in figure (3) with application of firm pressure at the level of the distal flexion crease of the wrist which is the proximal inlet of the carpal tunnel. A wrist ratio more than 0.7 was described by Johnson in 1983 as a square shaped wrist, while a WR less than 0.7 was described as rectangular wrist. He suggested that a squared wrist to be a risk factor for development of CTS.

![Fig. (1): The external wrist dimensions. (C): wrist width, (D): wrist depth](image)

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Fig. (2): Wrist ratio: D/C
(S): square wrist, (R): rectangular wrist

Fig. (3): Measurement of the wrist width using the engineering caliper.

C) Wrist-palm ratio:
Obtained by dividing the depth of the wrist by the length of the palm. Palm length was measured from the base of the middle finger to the level of the distal flexion crease of the wrist as shown in figure (3). It was taken as an index for the size of the hand; small hands have shorter palm length hence larger wrist-palm ratio.

Fig. (4): Palm length.

These measurements were obtained in order to:
* Calculate the range and average values for the wrist and wrist-palm ratios for control and CTS subjects.

* To determine whether these factors are related to the development of CTS and if they affect the severity of nerve conduction abnormalities of the condition. Because BMI, WR, WPR and age were suggested by many researchers to be personal risk factors for development of CTS. The term personal factors were applied in this study to describe these measurements in addition to age.

4) Nerve conduction studies
All studies were performed using the electromyography machine (MEB-7102; NIHONKOHDEN, TOKYO, JAPAN). The following studies were performed:
a) Median nerve antidromic sensory conduction study: Disk electrodes were used with the active electrode applied slightly distal to the metacarpophalangeal joints.
b) Median nerve motor conduction study: The active electrode was placed halfway between the midpoint of the distal flexion wrist crease and the palmar surface of the first metacarpophalangeal joint. The reference electrode was placed slightly distal to the joint. The ground electrode was placed over the dorsum of the Hand.
c) Ulnar nerve sensory and motor conduction studies: Ulnar nerve SNAP and CMAP were performed in order to exclude persons with ulnar-median cross over or those with peripheral polyneuropathy.

5) Statistical methods
The data of the patients and control subjects were expressed as the arithmetic mean ± the standard deviation. Spearman correlation was done to determine the degree of accordance (and discordance) between the degree of severity according to clinical classification and nerve conduction classification of the cases. Student’s t-test was also done to express relationship of body mass index, wrist ratio, wrist-palm ratio to the development and nerve conduction severity of CTS. T-test was first done to compare the means of the aforementioned parameters between the control subjects and the whole patient group. Then it was done to compare such parameters for the control subjects with each group of the CTS subjects.
RESULTS

This study was performed over 110 hands of 65 carpal tunnel syndrome (CTS) females with their ages ranging from 17 to 60 years and a mean age of 36.4 years. The condition was bilateral in 45 cases. The right hand was only affected in 12 cases and the left hand was only affected in 8 cases. In bilateral cases only the most affected hand according to nerve conduction results was included in the study. So the total included number of hands was 65, thirteen left hands and 52 right hands. Based on clinical evaluation, 28 cases of CTS were clinically mild (43.4%), 19 moderate (29 %), and 18 severe (27.6 %). The study showed the following results:

1) The frequency of presenting symptoms and signs in the studied patients with CTS was established (Tables 1 and 2).

2) The degree of accordance between the clinical and nerve conduction classification was 52% (discordance = 48%). The degree of accordance increases with the increase in clinical severity (Tables 3, 4, 5, 6 and 7). This reflects more increase in nerve conduction abnormalities with presence of more clinical signs of the disease.

3) There were statistically significant differences in BMI, WR, and WPR between the healthy and the patient groups.

4) There was statistically significant differences in BMI, WR, and WPR between the healthy group when compared to the moderate and severe cases (Tables 8 and 9).

<table>
<thead>
<tr>
<th>Clinical classification</th>
<th>Number</th>
<th>Pain</th>
<th>Paresthesia</th>
<th>Numbness</th>
<th>Falling of objects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>night</td>
<td>day</td>
<td>night</td>
<td>day</td>
</tr>
<tr>
<td>Mild</td>
<td>28</td>
<td>26</td>
<td>21</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Moderate</td>
<td>19</td>
<td>19</td>
<td>16</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Severe</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>63</td>
<td>55</td>
<td>65</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical classification</th>
<th>Number</th>
<th>Phalen test</th>
<th>Tinel test</th>
<th>Hypoesthesia</th>
<th>Weak abduction</th>
<th>Thenar atrophy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>28</td>
<td>23</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate</td>
<td>19</td>
<td>16</td>
<td>7</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1. Frequency of occurrence of symptoms in the different groups of carpal tunnel syndrome patient.

Table 2. Frequency of occurrence of clinical signs in the different groups of carpal tunnel syndrome patients.
Table 3. Frequency of occurrence of nerve conduction abnormalities in the different groups of carpal tunnel syndrome patients.

<table>
<thead>
<tr>
<th>Clinical classification</th>
<th>Number</th>
<th>Sensory nerve conduction studies</th>
<th>Motor nerve conduction studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Peak DSL</td>
<td>SNAP Amp</td>
</tr>
<tr>
<td>Mild</td>
<td>28</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>19</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Severe</td>
<td>18</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>45</td>
<td>11</td>
</tr>
</tbody>
</table>


Table 4. Results of nerve conduction classification in the clinically mild group (Data are expressed as the mean and the standard deviation).

<table>
<thead>
<tr>
<th>Nerve conduction classification</th>
<th>Sensory nerve conduction studies</th>
<th>Motor nerve conduction studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak DSL</td>
<td>SNAP amp</td>
</tr>
<tr>
<td>Normal conductivity</td>
<td>3.45±0.2</td>
<td>61±15.9</td>
</tr>
<tr>
<td>Mild</td>
<td>4.2±0.37</td>
<td>38±11.6</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.9±0.55</td>
<td>27.6±13.9</td>
</tr>
<tr>
<td>Severe</td>
<td>Unrecordable</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Results of nerve conduction classification in the clinically moderate group (Data are expressed as the mean and the standard deviation).

<table>
<thead>
<tr>
<th>Nerve conduction classification</th>
<th>Sensory nerve conduction studies</th>
<th>Motor nerve conduction studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak DSL</td>
<td>SNAP amp</td>
</tr>
<tr>
<td>Normal conductivity</td>
<td>3.45±0.2</td>
<td>61±15.9</td>
</tr>
<tr>
<td>Mild</td>
<td>4.2±0.37</td>
<td>38±11.6</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.9±0.55</td>
<td>27.6±13.9</td>
</tr>
<tr>
<td>Severe</td>
<td>Unrecordable</td>
<td></td>
</tr>
</tbody>
</table>
### Table 6. Results of nerve conduction classification in the clinically severe group (Data are expressed as the mean and the standard deviation).

<table>
<thead>
<tr>
<th>Nerve conduction classification</th>
<th>Sensory nerve conduction studies</th>
<th>Motor nerve conduction studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peak DSL</td>
<td>SNAP amp</td>
</tr>
<tr>
<td>Normal conduction</td>
<td>3.5±0.5</td>
<td>56±20</td>
</tr>
<tr>
<td>Mild</td>
<td>3.97±0.3</td>
<td>42.5±10</td>
</tr>
<tr>
<td>Moderate</td>
<td>4.8±0.6</td>
<td>34±10.8</td>
</tr>
<tr>
<td>Severe</td>
<td>Unrecordable</td>
<td>7.5±0.7</td>
</tr>
</tbody>
</table>

### Table 7. Degree of accordance and discordance between the degree of severity of clinical classification and nerve conduction classification (Data represent number of patients in each group).

<table>
<thead>
<tr>
<th>Nerve conduction classification</th>
<th>Normal conduction</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically mild</td>
<td>4</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Clinically moderate</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Clinically severe</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>16</strong></td>
<td><strong>26</strong></td>
<td><strong>16</strong></td>
<td><strong>65</strong></td>
</tr>
</tbody>
</table>

Spearman correlation :   R=0.52  at significant level P<0.001.
Total Degree of accordance = 52%
Degree of accordance for each class:
(mild cases= 39%), (moderate cases = 52.6%), (severe cases = 66%)

### Table 8. Comparison of wrist ratio, wrist-palm ratio, and body mass index between patients and control.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Controls</th>
<th>CTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>WR</td>
<td>0.696±0.041</td>
<td>0.725±0.04</td>
</tr>
</tbody>
</table>
Table 9. Body mass index, wrist ratio, and wrist-palm ratio among controls and CTS groups of increasing electrophysiological severity. (data are expressed as the mean and standard deviation)

<table>
<thead>
<tr>
<th>Personal factors</th>
<th>Control subjects</th>
<th>CTS with Normal conduction</th>
<th>CTS with Mild conduction abnormality</th>
<th>CTS with Moderate conduction abnormality</th>
<th>CTS with Severe conduction abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>WR</td>
<td>0.696±0.041</td>
<td>0.708±0.048</td>
<td>NS</td>
<td>0.718±0.054</td>
<td>NS</td>
</tr>
<tr>
<td>WPR</td>
<td>0.334±0.027</td>
<td>0.344±0.012</td>
<td>NS</td>
<td>0.347±0.022</td>
<td>NS</td>
</tr>
<tr>
<td>BMI</td>
<td>28.1±4.96</td>
<td>30.6±2.8</td>
<td>NS</td>
<td>30±8.6</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS : non significant (P>0.05). **(50.0>P) tnaeifingsi :* 
**(10.0>P) tnaeifings ylaredom :** *(100.0>P) tnaeifings ylhgh :***

DISCUSSION

The mean age of the patient population in our study was 38.4±11.5 years which is lesser than that reported (45 to 55 years) by many other authors. Observing the symptoms, by which the patients presented, our results are in accordance with those reported by Aulisa et al. The observed frequencies of signs in this study were: Phalen test in 84.6% of patients which is somewhat higher than that reported by others (51%) and (70%). Tinel test was observed in 35.4% of the patients group in comparison to 56 % reported by Durkan and 23% reported by others. Hypoesthesia was present in 52.3% which is similar to that reported by same study. Weakness and atrophy of the thenar muscles were present in 27.6% and 9% of patients in this study compared to 20% and 6% reported by Aulisa et al.

Sensory nerve conduction studies were abnormal in 89 % of the cases which is similar to that reported (85%: 99%) by other authors. Decreased CMAP amplitude was present in 7% of cases in comparison to 30% reported by Andre and coworkers. Reduced forearm nerve conduction velocity was noticed in 12% compared to 10% reported by Chang and associates. This study showed that the degree of discordance between clinical and electrophysiological classification is 48% which is similar to that reported by other authors. This study confirmed that WR is a risk factor for development of CTS and can affect the severity of the disease. Nathan et al found that WR was the third risk factor (body mass index and age being the first and second, respectively) for slowing of the median nerve conduction in a longitudinal study of CTS in industry.

But others had reported that wrist circumference and body mass index were not predictors for smaller canal area.

Many researchers found that small hands are more liable for development of CTS. These authors measured the hand length and palm width and obtained the ratio between them. They found that smaller hands are shorter and broader than the
control subjects\textsuperscript{14}. In this study, the palm length and thickness of the wrist were measured and WPR was obtained as an indication for small hands. This ratio was found to be significantly higher in patients than in the control subjects. This confirms the original proposition of Kouyoumidjian et al, that wrist-palm ratio (WPR) is another risk factor for CTS\textsuperscript{7}. Also, they reported that the severity of CTS increases with the gradual increase in WR and WPR\textsuperscript{7}. They also found that BMI was significantly increased with the increase in severity of CTS but only in mild and moderate cases in comparison to control subjects. Boz and coworkers found that WR, hand index (hand width ×100/ hand length) and digit index (digit 3 length×100/ hand length) were significant independent risk factors for CTS in females but not related to the severity of the condition\textsuperscript{14}. Also, WR was significant as a risk factor in the male patients but to a less extent. Only the BMI was related significantly to the severity of the condition in both male and female patients in their study\textsuperscript{14}. Moghtaderi et al studied the effect of WR, wrist circumference and BMI as risk factors for CTS. They found that wrist circumference is not a risk factor for CTS, but WR and BMI are independent risk factors although not related to the severity of CTS\textsuperscript{24}. Our study agreed with others’ and confirmed the relationship of WR and WPR to the severity of CTS in moderate and severe cases and also agreed with other studies\textsuperscript{14} that increase in BMI is associated with an increase in the severity of the condition.

**Conclusion**

This prospective study included 65 females with carpal tunnel syndrome (CTS) and 50 healthy females, for them nerve conduction studies were done and showed the following:

1) The degree of accordance between the clinical and nerve conduction classification was 52\% (discordance = 48\%). The degree of accordance increases with the increase in clinical severity.

2) These personal factors, BMI, WR, and WPR are related to the development of CTS and can affect the severity of the condition.

It is obvious in this study that there is moderate degree of accordance between the clinical classification and nerve conduction classification.

It is also confirmed that increased wrist ratio, wrist-palm ratio, and body mass index are important personal factors that increase the probability of occurrence of the disease and can affect the severity of the condition in carpal tunnel syndrome.

**Recommendation**

It is recommended to correlate the personal risk factors i.e. wrist ratio and wrist-palm ratio to the internal dimensions of the carpal tunnel using ultrasonography and magnetic resonance imaging that visualize the carpal tunnel and its contents including the median nerve, muscle tendons passing through the tunnel and any mass occupying lesion in the carpal tunnel space.

Healthy persons with these suggested risk factors should be aware to reduce their weight and should be learned how to use their hands properly, do nerve and tendon gliding exercise frequently to avoid development of the condition.

**REFERENCES**


المتخصصة العربية

دراسة توصيلية الأعصاب وعلاقتها بالأنعاس المختلفة لليذ وتتفاوت درجات الشذة في متلازمة اختناق العصبة الوسطى في اليد

المتخصصة العربية

يشمل هذا دراسة خاصةً بدراسة توصيلية اختناق العصب الوسطى في اليد بالإضافة إلى حبوب شعرية ملائمة.

وتهدف هذه الدراسة إلى: (1) تحديد درجة التوافق بين التصنيف الإكلينيكي والمرض بالمرض، (2) التحقق من التوصيل العصب (التصنيف الإكلينيكي). لذلك، اجري درجة شدة المرض لتحديد درجة التوافق علل-grade في كل من التصنيفين السابقين. (3) التحقق من وجود علاجات ملائمة للعصبية، (4) التحقق من توصيل العصبية للعصبية.

وتقرن هذه الدراسة بالدراسة التي تمت في كلاً من مرضى العصبية الانتقائي والمرض بالمرض.

وقد تم عمل ما يلي من الدراسات وقياس التأثير figura على مرضى العصبية الانتقائي والمرض بالمرض:

1. نتائج التوافق بين التصنيف الإكلينيكي والتصنيف الاحترافي 48% (نتيجة عدم التوافق). كما تظهر أن نسبة التوافق تزداد بزيادة درجة العصبية في كل من التصنيفين الإكلينيكي والاحترافي. 

2. وجود فروق ذات دلالة إحصائية بين كل علاجات الانتقائي العصبية والمرض بالمرض، مما يعنى أن الانتقائي العصبية تؤثر على درجة التوافق.

وقد تم التحقق من هذه الدراسة ما يلي:

- وجود درجة متوسطة من التوافق بين التصنيف الإكلينيكي والاحترافي.
- قد يعود هذا إلى الاختلافات في كلاً من التصنيفين علل-grade.

- التحقق من أن زيادة درجة العصبية تؤثر في كلاً من التصنيفين الإكلينيكي والاحترافي.

- التحقق من أن زيادة درجة العصبية تؤثر في كلاً من التصنيفين إكلينيكي الإكلينيكي.

ومع ذلك، يلزم أن يتم تطبيق هذه الدراسة لفهم هذه الظاهرة بشكل أفضل. مع ذلك، يجب أن يتم استكمال الدراسات في هذا المجال للحصول على نتائج أفضل.

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