# RESULTS

***Patients group:**

Fifty patients suffering from RA were carefully interrogated for the symptoms of restless legs syndrome (RLS) according to ***Gibb and Lees Criteria (1986),*** and were classified into two groups:

-The first group (I) including those patients presenting with the symptoms of RLS. They were 12 out of 50 (24%), 9 females (75%) and 3 males (25%). Their ages ranged between 38-60 years, with a mean of 49.91 ± 7.22 years. Their disease duration ranged between 1 and 10 years, with a mean of 4.91 ± 2.87 years.

-The second group (II) including those patients not presenting with the symptoms of RLS. They were 38 out of 50 (76%), 29 females (76.32%) and 9 males (23.68%). Their ages ranged between 30-60 years, with a mean of 46.97 ± 8.25 years. Their disease duration ranged between 1 and 10 years, with a mean of 4.13 ± 2.48 years.

***The control group:**

Ten apparently healthy subjects were carefully chosen not presenting with the symptoms of RLS, matched for age, sex and socio-economic class with the patients. They were 7 females (70%) and 3 males (30%). Their ages ranged between 35-60 years, with a mean of 48.1 ± 7.35 years.

***Results of the demographic data:**

-Age distribution:

The different studied groups were matched as regards mean age being 49.91 ± 7.22, 46.97 ± 8.25, 48.1 ± 7.35 years, in RA patients group (I), RA patients group (II) and the control group respectively.

*So there is a statistically insignificant difference between all groups (P >0.05).* Table (1).

-Sex distribution:

There is a statistically insignificant difference in sex distribution between the different groups with a ratio of 75% female to 25% male in RA patients group (I), 76.32% female to 23.68% male in RA patients group (II), and 70% female to 30% male in the control group (P > 0.05). Table (2), Pie chart (1)

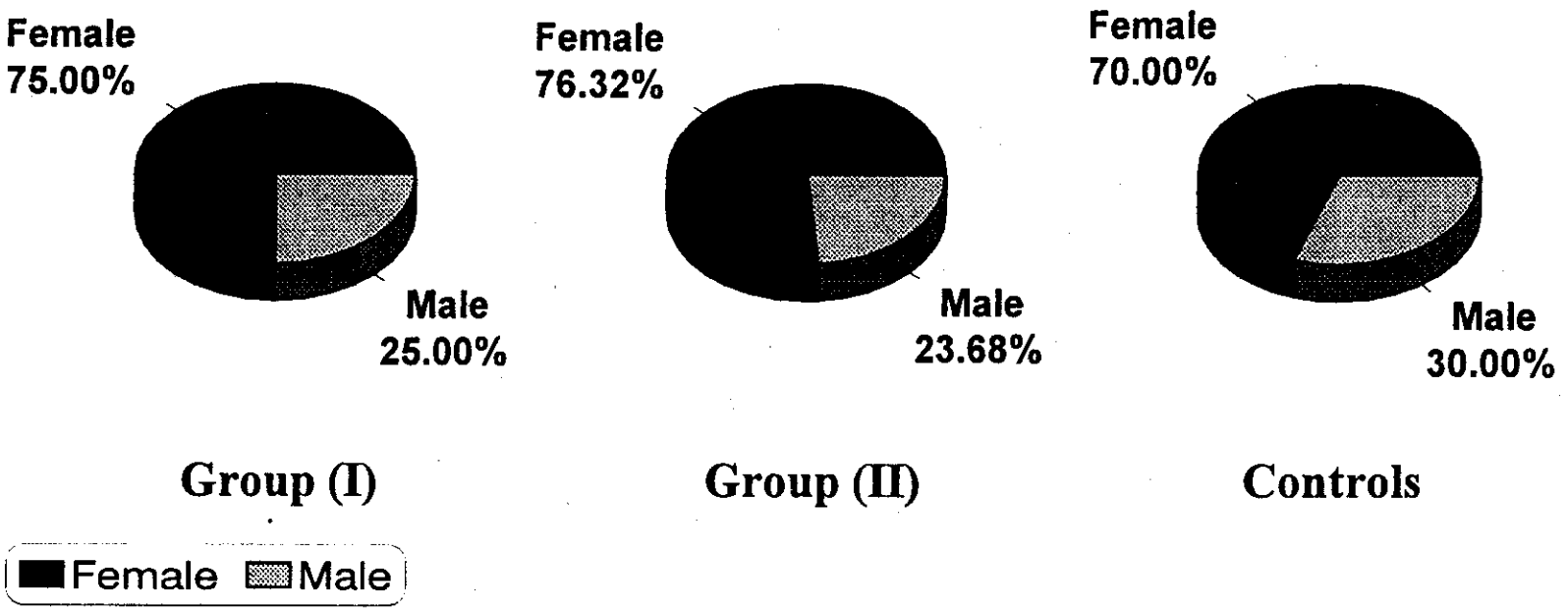
***Table (1): Age distribution in the studied groups:**

| Group / Age | (I) RA with *RLS* | | (II) RA without *RLS* | | Controls | |
|---|---|---|---|---|---|---|
| | *Min.* | *Max.* | *Min.* | *Max.* | *Min.* | *Max.* |
| Range | 38 | 60 | 30 | 60 | 35 | 60 |
| N | 12 | | 38 | | 10 | |
| X` | 49.91 | | 46.97 | | 48.1 | |
| ± SD | 7.22 | | 8.25 | | 7.35 | |
| F | 0.64 | | | | | |
| P | > 0.05 non significant | | | | | |

***Table (2): Sex distribution in the studied groups:**

| Group / Sex | (I) RA with *RLS* | | (II) RA without *RLS* | | Controls | |
|---|---|---|---|---|---|---|
| | *N* | *%* | *N* | *%* | *N* | *%* |
| Female | 9 | 75 | 29 | 76.32 | 7 | 70 |
| Male | 3 | 25 | 9 | 23.68 | 3 | 30 |
| $X^2$ | 0.168 | | | | | |
| P | > 0.05 non significant | | | | | |

# *Sex distribution in the studied groups*




***Pie chart (1).***

***Results of the clinical studies:**

-There is a statistically insignificant difference between the mean duration of the disease in RA patients group (I) being 4.91 ± 2.87 years in comparison to 4.13 ± 2.48 years in RA patients group (II), where T = 0.91 and P > 0.05. Table (3)

-There is a mildly statistically significant increase in the mean duration of morning stiffness in RA patients group (I) being 42.08 ± 21.58 minutes in comparison to 31.05 ± 14.38 minutes in RA patients group (II), where T = 2.04 and P ≤ 0.05. Table (3)

-On calculating the articular index for the patients, there is a highly statistically significant increase in the mean articular index in RA patients group (I) being 34.91 ± 12.28 in comparison to 22.07 ± 6.11 in RA patients group (II), where T = 4.86 and P ≤ 0.001. Table (3)

-There is a highly statistically significant decrease in the mean degree of grip strength of the right hands in RA patients group (I) being 92.5 ± 16.02 mmHg in comparison to 110.1 ± 12.41 mmHg in RA patients group (II), where T = 3.98 and P ≤ 0.001. Also there is a mildly statistically significant decrease as regards the mean degree of grip strength of the left hands in the same patients being 98.33 ± 22.08 mmHg and 109.86 ± 14.4 mmHg respectively, where T = 2.11 and P ≤ 0.05. Table (3)

-There is a highly statistically significant increase in the mean visual analogue scale in RA patients group (I) being 5.66 ± 1.43 cm. in

comparison to 3.26 ± 1.05 cm. in RA patients group (II), where T = 6.28 and P ≤ 0.001. Table (3)

-There is a highly statistically significant increase in the mean clinical spread / severity index in RA patients group (I) being 22.66 ± 8.24 in comparison to 15.63 ± 3.5 in RA patients group (II), where T= 4.24 and P ≤ 0.001. Table (3)

-The functional capacity classification, was grade I in 3 patients (25%), grade II in 6 patients (50%) and grade III in 3 patients (25%) in RA patients group (I) and it was grade I in 9 patients (23.68%), grade II in 18 patients (47.37%), and grade III in 11 patients (28.95%) in RA patients group (II). There is a statistically insignificant difference in comparison to each other, where $X^2 = 0.07$ and P > 0.05. Table (4), Pie chart (2)

-As regards sleep disturbances, there were disorders of initiating and maintaining sleep in 11 patients (91.67%) in RA patients group (I) and in 6 patients (15.79%) in RA patients group (II). There is a highly statistically significant difference in comparison to each other, where $X^2$= 20.14 and P ≤ 0.001. Also there was excessive daytime somnolence in 6 patients (50%) in RA patients group (I) and in 4 patients (10.53%) in RA patients group (II). There is a moderately statistically significant difference in comparison to each other, where $X^2$= 6.58 and P ≤ 0.01. Table (5).

***Table (3): Comparison between the mean of the clinical variables of RA patients with and without RLS.**

| Group *Clinical* | (I) RA with RLS | | | (II) RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| Duration (years) | 12 | 4.91 | 2.87 | 38 | 4.13 | 2.48 | 0.91 | > 0.05 |
| M.S. (minutes) | 12 | 42.08 | 21.58 | 38 | 31.05 | 14.38 | 2.04 | * ≤ 0.05 |
| A.I. | 12 | 34.91 | 12.28 | 38 | 22.07 | 6.11 | 4.86 | *** ≤ 0.001 |
| Rt. G.S. (mmHg) | 12 | 92.5 | 16.02 | 38 | 110.1 | 12.41 | 3.98 | *** ≤ 0.001 |
| Lt. G.S. (mmHg) | 12 | 98.33 | 22.08 | 38 | 109.86 | 14.4 | 2.11 | * ≤ 0.05 |
| V.A.S. (cm.) | 12 | 5.66 | 1.43 | 38 | 3.26 | 1.05 | 6.28 | *** ≤ 0.001 |
| C.S.S.I. | 12 | 22.66 | 8.24 | 38 | 15.63 | 3.5 | 4.24 | *** ≤ 0.001 |

**M.S.** Morning stiffness.
**A.I.** Articular index.
**G.S.** Grip strength.
**V.A.S.** Visual analogue scale.
**C.S.S.I.** Clinical spread / severity index.
**SD** Standard deviation.
**N** Number.
**X`** Mean.
* Mildly significant.
*** Highly significant

***Table (4): Comparison between the functional capacities in RA patients with and without RLS.**

| F.C. *Group* | I | | II | | III | | $X^2$ | P |
|---|---|---|---|---|---|---|---|---|
| | *N* | *%* | *N* | *%* | *N* | *%* | | |
| (I) RA with RLS | 3 | 25 | 6 | 50 | 3 | 25 | 0.07 | > 0.05 non significant |
| (II) RA without RLS | 9 | 23.68 | 18 | 47.37 | 11 | 28.95 | | |

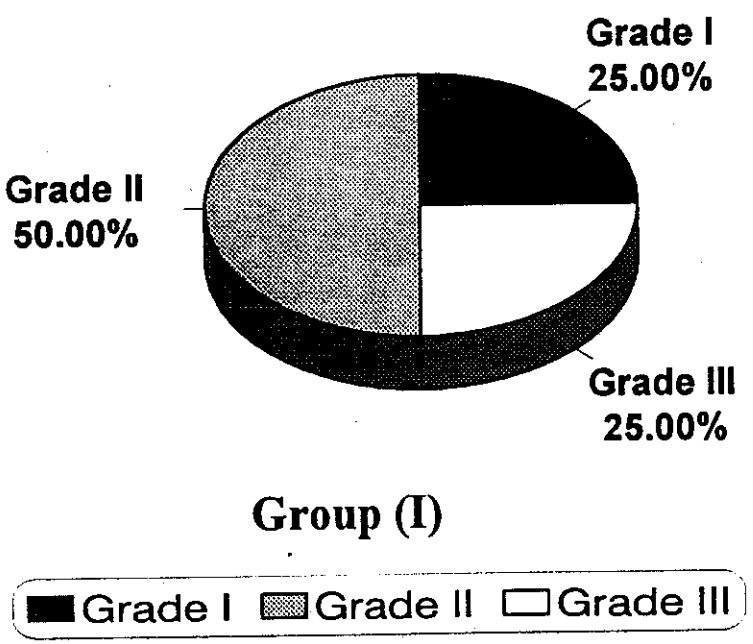
**F.C.** **Functional capacity.**

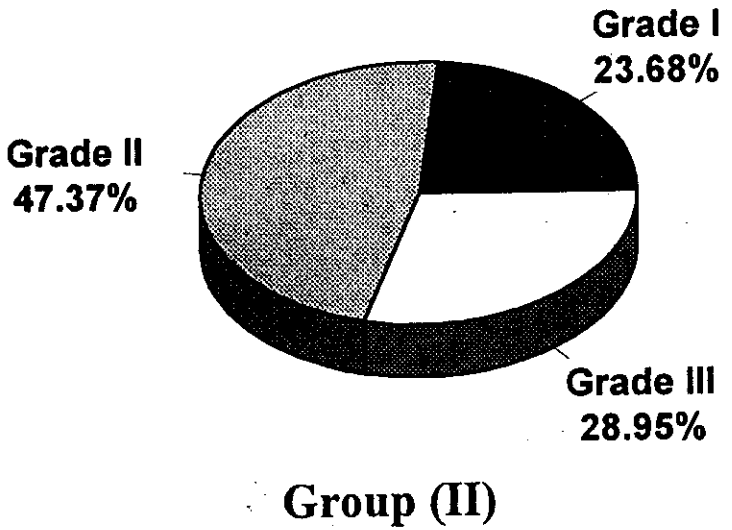
***Table (5): Comparison between the incidence of sleep disturbances in RA patients with and without RLS.**

| Group *Sleep disturbances* | (I) RA with RLS | | (II) RA without RLS | | $X^2$ | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | | |
| DIMS | 11 | 91.67 | 6 | 15.79 | 20.14 | *** ≤ 0.001 |
| EDS | 6 | 50 | 4 | 10.53 | 6.58 | ** ≤ 0.01 |

**DIMS** **Disorders of initiating and maintaining sleep.**
**EDS** **Excessive daytime somnolence.**
** **Moderately significant.**
*** **Highly significant.**

# Functional capacities in RA patients with and without RLS




*Pie chart (2).*

***Results of the laboratory studies:**

-There is a statistically insignificant difference between the mean level of the erythrocyte sedimentation rate (E.S.R) in RA patients group (I) being 72.91 ± 25.44 mm / hour in comparison to 62.1 ± 24.46 mm / hour in RA patients group (II), where T = 1.32 and P > 0.05. Table (6)

-There is a statistically insignificant difference between the mean level of C-reactive protein in RA patients group (I) being 54 ± 52.05 mg / L in comparison to 39.78 ± 45.76 mg / L in RA patients group (II), where T = 0.9 and P > 0.05. Table (6)

-There is a highly statistically significant decrease in the mean level of haemoglobin in RA patients group (I) being 9.32 ± 0.99 gm / dL in comparison to 10.98 ± 1.19 gm / dL in RA patients group (II), where T = 4.36 and P ≤ 0.001. Table (6)

-There is a highly statistically significant decrease in the mean level of serum ferritin in RA patients group (I) being 77.25 ± 17.34 µg / L in comparison to 109.47 ± 28.84 µg / L in RA patients group (II), where T = 3.65 and P ≤ 0.001. Table (6)

-There is a statistically insignificant difference between the mean level of fasting blood glucose, 2-hours post prandial blood glucose, serum creatinine, total serum calcium and serum magnesium in RA patients group (I) being 88.33 ± 5.46 mg / dL, 112.41 ± 7.87 mg/dL, 0.89 ± 0.16 mg/dL, 9.27 ± 0.45 mg/dL and 1.71 ± 0.26 mEq/L, respectively in comparison to 90.57 ± 6.28 mg /dL, 115.1 ± 7.85 mg/dL, 0.88 ± 0.19

mg/dL, 9.42 ± 0.53 mg/dL and 1.75 ± 0.24 mEq/L, respectively in RA patients group (II). These values were within the laboratory reference ranges in all patients, where T = 1.11, 1.03, 0.11, 0.85 and 0.49 and P > 0.05. Table (6)

-Nine patients (75%) had a positive rheumatoid factor (RF) in group (I), while 28 patients (73.68%) in group (II) were seropositive with a non significant difference between both groups, where $X^2 = 0.08$ and P > 0.05. Table (7),pie Chart (3)

***Table (6): Comparison between the mean of the laboratory variables of RA patients with and without RLS.**

| Group *Laboratory* | (I) RA with RLS | | | (II) RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| E.S.R. mm/h | 12 | 72.91 | 25.44 | 38 | 62.1 | 24.46 | 1.32 | P > 0.05 |
| C-reactive protein mg/L | 12 | 54.0 | 52.05 | 38 | 39.78 | 45.76 | 0.9 | P > 0.05 |
| Hb. gm/L | 12 | 9.32 | 0.99 | 38 | 10.98 | 1.19 | 4.36 | P $^{***}\leq$ 0.001 |
| Serum Ferritin µg/L | 12 | 77.25 | 17.34 | 38 | 109.47 | 28.84 | 3.65 | P $^{***}\leq$ 0.001 |
| Fasting Bl. glucose mg/dL | 12 | 88.33 | 5.46 | 38 | 90.57 | 6.28 | 1.11 | P > 0.05 |
| 2h.P.P. Bl. glucose mg/dL | 12 | 112.41 | 7.87 | 38 | 115.1 | 7.85 | 1.03 | P > 0.05 |
| Serum creatinine mg/dl | 12 | 0.89 | 0.16 | 38 | 0.88 | 0.19 | 0.11 | P > 0.05 |
| Total serum calcium mg/dl | 12 | 9.27 | 0.45 | 38 | 9.42 | 0.53 | 0.85 | P > 0.05 |
| Serum magnesium mEq/L | 12 | 1.71 | 0.26 | 38 | 1.75 | 0.24 | 0.49 | P > 0.05 |

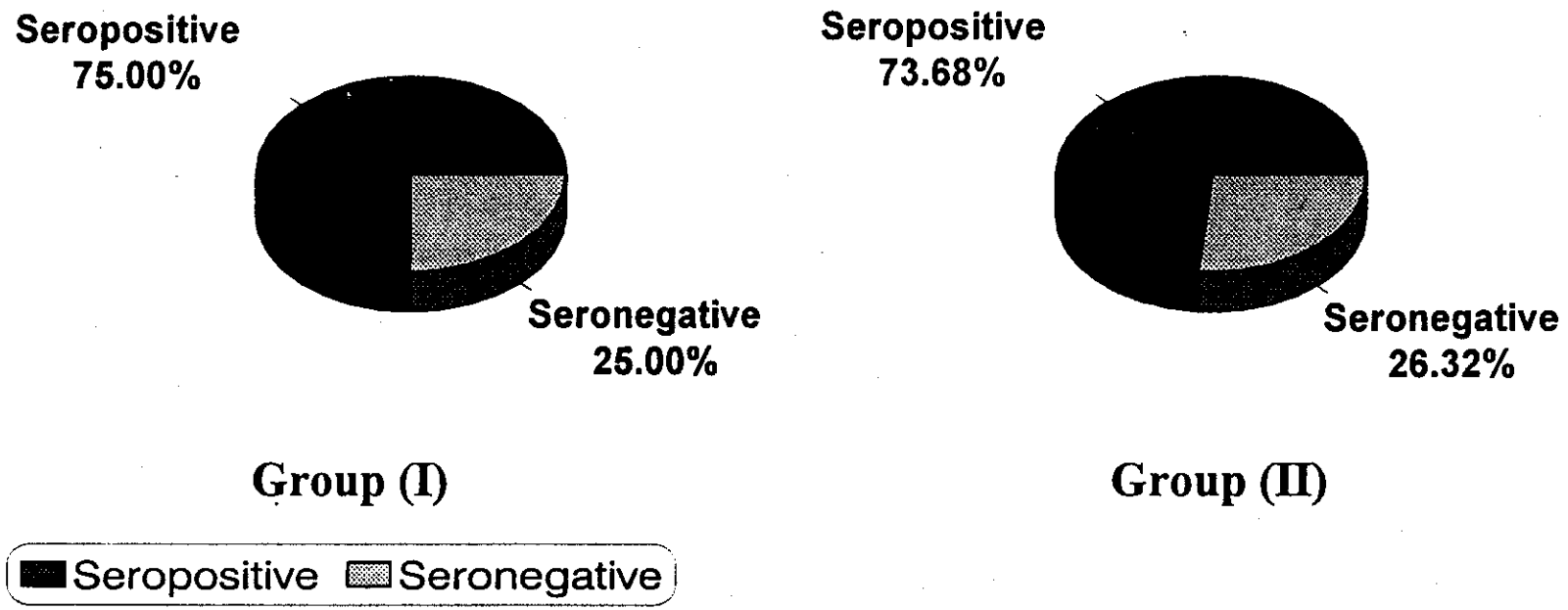
**E.S.R.** **Erythrocyte sedimentation rate**
**HB** **Haemoglobin**
******* **Highly significant.**

*Table (7): Comparison between seropositivity and seronegativity in RA patients with and without RLS.

| RF *Group* | + Ve | | - Ve | | $X^2$ | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | | |
| (I) RA with RLS | 9 | 75 | 3 | 25 | 0.08 | > 0.05 non significant |
| (II) RA without RLS | 28 | 73.68 | 10 | 26.32 | | |

R.F. Rheumatoid factor.

# *Seropositivity and seronegativity in RA patients with and without RLS*




*Pie chart (3).*

***Results of the radiological studies:**

-There is a statistically insignificant difference between the incidence of atlanto - axial subluxation in RA patients group (I) being 2 patients (16.67%) in comparison to 1 patient (2.63%) in RA patients group (II), where $X^2 = 1.18$ and $P > 0.05$. Table (8), Pie chart (4)

-Progression of RA according to radiological grading was grade I in 1 patient (8.33%), grade II in 4 patients (33.33%), grade III in 4 patients (33.33%) and grade IV in 3 patients (25%) in RA patients group (I) and it was grade I in 12 patients (31.58%), grade II in 17 patients (44.74%), grade III in 6 patients (15.79%) and grade IV in 3 patients (7.89%) in RA patients group (II). There is a statistically insignificant difference in comparison to each other, where $X^2 = 5.8$ and $P > 0.05$. Table (9), Pie chart (5)

*Table (8): Comparison between the incidence of atlanto - axial subluxation in RA patients with and without RLS.

| A.A.S *Group* | + Ve | | - Ve | | $X^2$ | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | | |
| (I) RA with RLS | 2 | 16.67 | 10 | 83.33 | 1.18 | > 0.05 non significant |
| (II) RA without RLS | 1 | 2.63 | 37 | 97.37 | | |

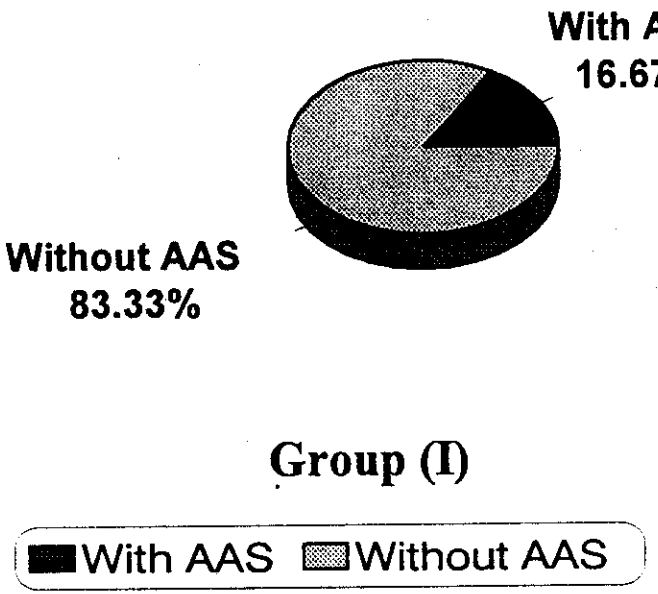
A.A.S. Atlanto-axial subluxation.

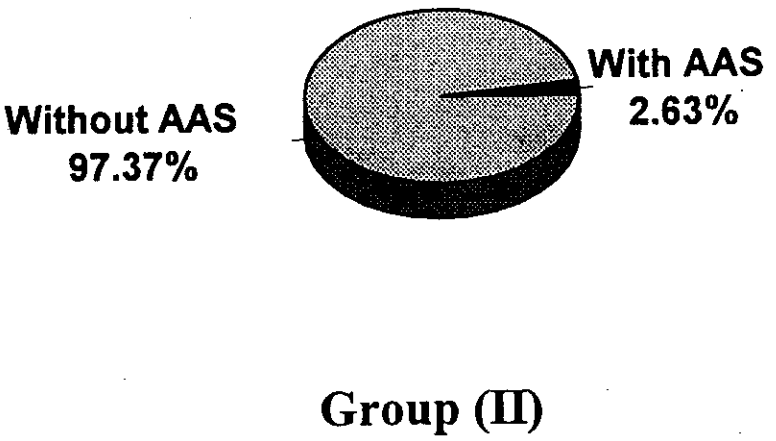
*Table (9): Comparison between radiological grading of severity in RA patients with and without RLS.

| R.G *Group* | I | | II | | III | | IV | | $X^2$ | P |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % | *N* | % | | |
| (I) RA with RLS | 1 | 8.33 | 4 | 33.33 | 4 | 33.33 | 3 | 25 | 5.8 | > 0.05 non significant |
| (II) RA without RLS | 12 | 31.58 | 17 | 44.74 | 6 | 15.79 | 3 | 7.89 | | |

R.G. Radiological grading.

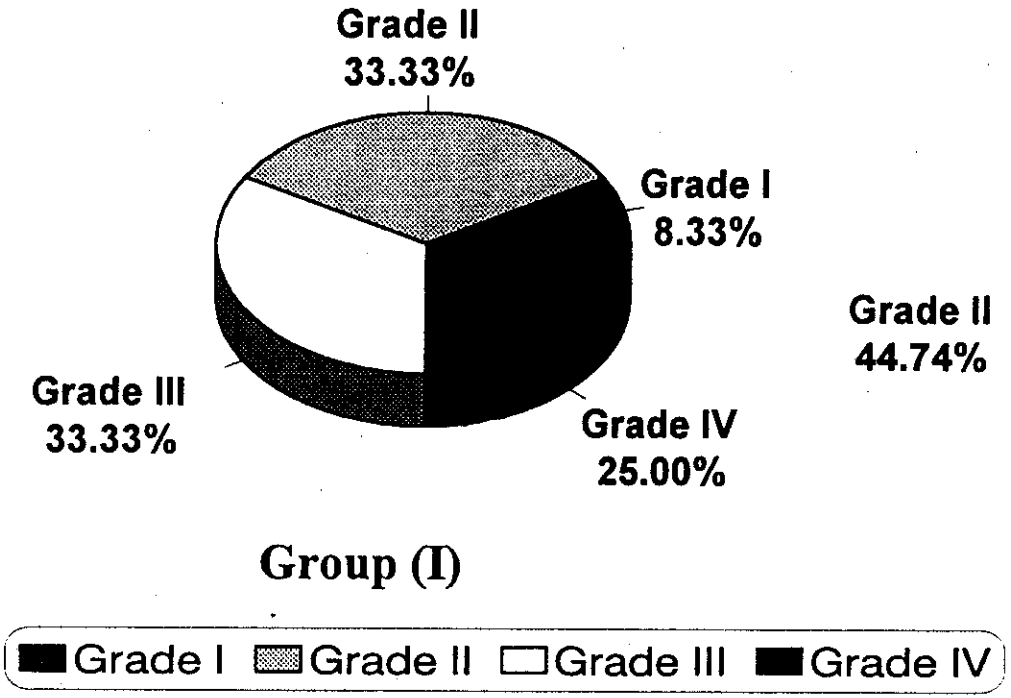
# *Incidence of atlanto-axial subluxation in RA patients with and without RLS*




*Pie chart (4).*

# *Radiological grading of severity in RA patients with and without RLS*




*Pie chart (5).*

***Results of the neurophysiological studies:**

**(1)** Statistical analysis of the results of the neurophysiological studies in RA patients group (I) and group (II) in the right side in comparison to the left side in each group.

-There is a statistically insignificant delay in the mean distal latency of the left posterior tibial nerve in RA patients group (I) being 5.93 ± 1.15 m.sec. in comparison to 5.52 ± 1.26 m. sec. in the right posterior tibial nerve of the same group, where $T = 0.84$ and $P > 0.05$. Table (10)

-There is a statistically insignificant decrease in the mean motor conduction velocity of the left posterior tibial nerve in RA patients group (I) being 43.56 ± 6.26 m/sec. in comparison to 44.16 ± 7.49 m/sec. in the right posterior tibial nerve of the same group, where $T = 0.21$ and $P > 0.05$. Table (10)

-There is a statistically insignificant delay in the mean latency of the right sural nerve when stimulated antidromically at 10 cm. in RA patients group (I) being 4.49 ± 0.62 m. sec. in comparison to 4.50 ± 0.98 m. sec. in the left sural nerve of the same group, where $T = 0.03$ and $P > 0.05$. Table (10)

-There is a statistically insignificant decrease in the mean amplitude of evoked sensory potential of the left sural nerve in RA patients group (I) being 3.85 ± 1.62 μ.v. in comparison to 4.59 ± 2.38 μ.v. in the

right sural nerve of the same group, where T = 0.87 and P > 0.05. Table (10)

-There is a statistically insignificant decrease in the mean sensory conduction velocity of the right sural nerve in RA patients group (I) being 22.73 ± 4.03 m / sec. in comparison to 23.19 ± 5.18 m / sec. in the left sural nerve of the same group, where T = 0.24 and P > 0.05. Table (10)

-There is a statistically insignificant delay in the mean F-wave latency of the right posterior tibial nerve when stimulated at the ankle in RA patients group (I) being 53.26 ± 8.34 m.sec. in comparison to 53.50 ± 4.84 m. sec. in the left posterior tibial nerve of the same group, where T = 0.08 and P > 0.05. Table (10)

-There is a statistically insignificant delay in the mean distal latency of the right posterior tibial nerve in RA patients group (II) being 5.09 ± 0.71 m.sec. in comparison to 5.08 ± 0.70 m. sec. in the left posterior tibial nerve of the same group, where T = 0.06 and P > 0.05. Table (11)

-There is a statistically insignificant decrease in the mean motor conduction velocity of the left posterior tibial nerve in RA patients group (II) being 48.07 ± 4.89 m/sec. in comparison to 49.57 ± 5.81 m/sec. in the right posterior tibial nerve of the same group, where T = 1.21 and P > 0.05. Table (11)

-There is a statistically insignificant delay in the mean latency of the right sural nerve when stimulated antidromically at 10 cm. in RA patients group (II) being 3.32 ± 0.72 m. sec. in comparison to 3.24 ± 0.86 m. sec. in the left sural nerve of the same group, where T = 0.44 and P > 0.05. Table (11)

-There is a statistically insignificant decrease in the mean amplitude of evoked sensory potential of the right sural nerve in RA patients group (II) being 12.59 ± 6.99 μ.v. in comparison to 13.58 ± 6.40 μ.v. in the left sural nerve of the same group, where T = 0.64 and P > 0.05. Table (11)

-There is a statistically insignificant decrease in the mean sensory conduction velocity of the right sural nerve in RA patients group (II) being 31.45 ± 6.07 m/sec. in comparison to 32.29 ± 6.13 m/sec. in the left sural nerve of the same group, where T = 0.59 and P > 0.05. Table (11)

-There is a mildly statistically significant delay in the mean F-wave latency of the left posterior tibial nerve when stimulated at the ankle in RA patients group (II) being 51.09 ± 3.73 m.sec. in comparison to 49.36 ± 3.91 m. sec. in the right posterior tibial nerve of the same group, where T = 1.97 and P ≤ 0.05. Table (11)

*Table (10): Comparison between the mean of the neurophysiological studies in RA patients with RLS in the right and left side.

| Side | Right | | | Left | | | T | P |
|---|---|---|---|---|---|---|---|---|
| *Post. tibial nerve* | N | X` | ± SD | N | X` | ± SD | | |
| Distal latency (m.sec.) | 12 | 5.52 | 1.26 | 12 | 5.93 | 1.15 | 0.84 | > 0.05 |
| MCV (m/sec.) | 12 | 44.16 | 7.49 | 12 | 43.56 | 6.26 | 0.21 | > 0.05 |
| Sural Nerve latency at 10cm (m.sec.) | 12 | 4.49 | 0.62 | 12 | 4.50 | 0.98 | 0.03 | > 0.05 |
| AESP (μ.V.) | 12 | 4.59 | 2.38 | 12 | 3.85 | 1.62 | 0.87 | > 0.05 |
| SCV (m/sec.) | 12 | 22.73 | 4.03 | 12 | 23.19 | 5.18 | 0.24 | > 0.05 |
| Post. tibial nerve at the ankle F-wave latency (m.sec.) | 12 | 53.26 | 8.34 | 12 | 53.50 | 4.84 | 0.08 | > 0.05 |

MCV Motor conduction velocity.
AESP Amplitude of evoked sensory potential.
SCV Sensory conduction velocity.

*Table (11): Comparison between the mean of the neurophysiological studies in RA patients without RLS in the right and left side.

| Side | Right | | | Left | | | T | P |
|---|---|---|---|---|---|---|---|---|
| *Post. tibial nerve* | N | X` | ± SD | N | X` | ± SD | | |
| Distal latency (m.sec.) | 38 | 5.09 | 0.71 | 38 | 5.08 | 0.70 | 0.06 | > 0.05 |
| MCV (m/sec.) | 38 | 49.57 | 5.81 | 38 | 48.07 | 4.89 | 1.21 | > 0.05 |
| Sural Nerve latency at 10cm (m.sec.) | 38 | 3.32 | 0.72 | 38 | 3.24 | 0.86 | 0.44 | > 0.05 |
| AESP (μ.V.) | 38 | 12.59 | 6.99 | 38 | 13.58 | 6.40 | 0.64 | > 0.05 |
| SCV (m/sec.) | 38 | 31.45 | 6.07 | 38 | 32.29 | 6.13 | 0.59 | > 0.05 |
| Post. tibial nerve at the ankle F-wave latency (m.sec.) | 38 | 49.36 | 3.91 | 38 | 51.09 | 3.73 | 1.97 | *≤ 0.05 |

MCV Motor conduction velocity.
AESP Amplitude of evoked sensory potential.
SCV Sensory conduction velocity.
* mildly significant.

(2) Statistical analysis of the results of the neurophysiological studies in RA patients group (I) in comparison to RA patients group (II) and the control group.

-There is a mildly statistically significant difference in the mean distal latency of the right posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 5.52 ± 1.26 m.sec., 5.09 ± 0.71 m.sec. and 4.61 ± 0.71 m.sec. respectively, where F = 3.15 and P ≤ 0.05. Table (12)

-There is a highly statistically significant difference in the mean motor conduction velocity of the right posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 44.16 ± 7.49 m.sec., 49.57 ± 5.81 m/sec. and 54.52 ± 6.27 m/sec. respectively, where F = 7.57 and P ≤ 0.001. Table (12)

-There is a moderately statistically significant difference in the mean distal latency of the left posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 5.93 ± 1.15 m.sec., 5.08 ± 0.7 m.sec. and 4.98 ± 0.53 m.sec. respectively, where F = 5.95 and P ≤ 0.01. Table (12)

-There is a moderately statistically significant difference in the mean motor conduction velocity of the left posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 43.56 ± 6.26 m/sec., 48.07 ± 4.89 m/sec. and 51.95 ± 6.71 m/sec. respectively, where F = 6.44 and P ≤ 0.01. Table (12)

-There is a highly statistically significant difference in the mean latency of the right sural nerve when stimulated antidromically at 10 cm. in RA patients group (I), RA patients group (II) and the control group being 4.49 ± 0.62 m.sec., 3.32 ± 0.72 m.sec. and 2.5 ± 0.23 m.sec. respectively, where $F = 26.85$ and $P \leq 0.001$. Table (13)

-There is a highly statistically significant difference in the mean amplitude of evoked sensory potential of the right sural nerve in RA patients group (I), RA patients group (II) and the control group being 4.59 ± 2.38 μ.V., 12.59 ± 6.99 μ.V. and 22.78 ± 2.42 μ.V. respectively, where $F = 26.7$ and $P \leq 0.001$. Table (13)

-There is a highly statistically significant difference in the mean sensory conduction velocity of the right sural nerve in RA patients group (I), RA patients group (II) and the control group being 22.73 ± 4.03 m/sec., 31.45 ± 6.07 m/sec. and 40.24 ± 3.76 m/sec. respectively, where $F = 28.62$ and $P \leq 0.001$. Table (13)

-There is a highly statistically significant difference in the mean latency of the left sural nerve when stimulated antidromically at 10 cm. in RA patients group (I), RA patients group (II) and the control group being 4.5 ± 0.98 m.sec., 3.24 ± 0.86 m.sec. and 2.55 ± 0.25 m.sec. respectively, where $F = 16.51$ and $P \leq 0.001$. Table (13)

-There is a highly statistically significant difference in the mean amplitude of evoked sensory potential of the left sural nerve in RA

patients group (I), RA patients group (II) and the control group being 3.85 ± 1.62 μ.V., 13.58 ± 6.4 μ.V. and 21.35 ± 3.55 m/sec. respectively, where F = 29.4 and P ≤ 0.001. Table (13)

-There is a highly statistically significant difference in the mean sensory conduction velocity of the left sural nerve in RA patients group (I), RA patients group (II) and the control group being 23.19 ± 5.18 m/sec., 32.29 ± 6.13 m/sec. and 39.44 ± 4.23 m/sec. respectively, where F = 22.78 and P ≤ 0.001. Table (13)

-There is a mildly statistically significant difference in the mean F-wave latency of the right posterior tibial nerve when stimulated at the ankle in RA patients group (I), RA patients group (II) and the control group being 53.26 ± 8.34 m.sec., 49.36 ± 3.91 m.sec. and 48.33 ± 2.47 m.sec. respectively, where F = 3.52 and P ≤ 0.05. Table (14)

-There is a statistically insignificant difference in the mean F-wave latency of the left posterior tibial nerve when stimulated at the ankle in RA patients group (I), RA patients group (II) and the control group being 53.5 ± 4.84 m.sec., 51.09 ± 3.73 m.sec. and 51.01 ± 2.91 m.sec. respectively, where F = 1.89 and P > 0.05. Table (14)

-There is a statistically insignificant difference in the mean absolute latency of the lumbar evoked potential when testing somatosensory evoked potentials for the left posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 21.71 ±

3.07 m.sec., 20.1 ± 2.41 m.sec. and 19.42 ± 1.6 m.sec. respectively, where $F = 2.74$ and $P > 0.05$. Table (15)

-There is a highly statistically significant difference in the mean absolute latency of the cortical evoked potential when testing somatosensory evoked potentials for the left posterior tibial nerve in RA patients group (I), RA patients group (II) and the control group being 46.12 ± 10.2 m.sec., 36.41 ± 4.93 m.sec. and 35.54 ± 2.24 m.sec. respectively, where $F = 12.89$ and $P \leq 0.001$. Table (15)

**Table (12): Comparison between the mean distal latency in m.sec. and motor conduction velocity in m/sec. of the right and left posterior tibial nerves in RA patients with RLS, RA patients without RLS and the control group.**

| Group | (I) RA with RLS | | | (II) RA without RLS | | | Controls | | | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Post. tibial nerve | N | X` | ±SD | N | X` | ±SD | N | X` | ±SD | | |
| Rt. distal latency (m.sec.) | 12 | 5.52 | 1.26 | 38 | 5.09 | 0.71 | 10 | 4.61 | 0.71 | 3.15 | $^{*}\leq 0.05$ |
| Rt. MCV (m/sec.) | 12 | 44.16 | 7.49 | 38 | 49.57 | 5.81 | 10 | 54.52 | 6.27 | 7.57 | $^{***}\leq 0.001$ |
| Lt. distal latency (m.sec.) | 12 | 5.93 | 1.15 | 38 | 5.08 | 0.7 | 10 | 4.98 | 0.53 | 5.95 | $^{**}\leq 0.01$ |
| Lt. MCV (m/sec.) | 12 | 43.56 | 6.26 | 38 | 48.07 | 4.89 | 10 | 51.95 | 6.71 | 6.44 | $^{**}\leq 0.01$ |

MCV Motor conduction velocity.
* Mildly significant.
** Moderately significant.
*** Highly significant.

**Table (13): Comparison between the mean of the latency at 10 cm. in m.sec., amplitude of evoked sensory potential in μ.v. and sensory conduction velocity in m/sec. of the right and left sural nerves in RA patients with RLS, RA patients without RLS and the control group.**

| Group / Sural nerve | (I) RA with RLS | | | (II) RA without RLS | | | Controls | | | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | X` | ±SD | N | X` | ±SD | N | X` | ±SD | | |
| Rt. latency at 10 cm. (m.sec.) | 12 | 4.49 | 0.62 | 38 | 3.32 | 0.72 | 10 | 2.5 | 0.23 | 26.85 | *** ≤ 0.001 |
| Rt. AESP (μ.v.) | 12 | 4.59 | 2.38 | 38 | 12.59 | 6.99 | 10 | 22.78 | 2.42 | 26.70 | *** ≤ 0.001 |
| Rt. SCV (m/sec.) | 12 | 22.73 | 4.03 | 38 | 31.45 | 6.07 | 10 | 40.24 | 3.76 | 28.62 | *** ≤ 0.001 |
| Lt. latency at 10 cm. (m.sec.) | 12 | 4.5 | 0.98 | 38 | 3.24 | 0.86 | 10 | 2.55 | 0.25 | 16.51 | *** ≤ 0.001 |
| Lt. AESP (μ.v.) | 12 | 3.85 | 1.62 | 38 | 13.58 | 6.4 | 10 | 21.35 | 3.55 | 29.40 | *** ≤ 0.001 |
| Lt. SCV (m/sec.) | 12 | 23.19 | 5.18 | 38 | 32.29 | 6.13 | 10 | 39.44 | 4.23 | 22.78 | *** ≤ 0.001 |

AESP Amplitude of evoked sensory potential.
SCV Sensory conduction velocity.
*** Highly significant.

**Table (14): Comparison between the mean F-wave latency in m.sec. of the right and left posterior tibial nerves stimulated at the ankle in RA patients with RLS, RA patients without RLS and the control group.**

| Group | (I) RA with RLS | | | (II) RA without RLS | | | Controls | | | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Post. tibial nerve at the ankle | N | X` | ±SD | N | X` | ±SD | N | X` | ±SD | | |
| Rt. F-wave latency (m.sec.) | 12 | 53.26 | 8.34 | 38 | 49.36 | 3.91 | 10 | 48.33 | 2.47 | 3.52 | *≤ 0.05 |
| Lt. F-wave latency (m.sec.) | 12 | 53.5 | 4.84 | 38 | 51.09 | 3.73 | 10 | 51.01 | 2.91 | 1.89 | > 0.05 |

* Mildly significant.

**Table (15): Comparison between the mean absolute latency in m.sec. of SSEPs for the left posterior tibial nerve in RA patients with RLS, RA patients without RLS and the control group.**

| Group | (I) RA with RLS | | | (II) RA without RLS | | | Controls | | | F | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lt. Post. tibial nerve SSEPs | N | X` | ±SD | N | X` | ±SD | N | X` | ±SD | | |
| Absolute latency Lp (m.sec.) | 12 | 21.71 | 3.07 | 38 | 20.1 | 2.41 | 10 | 19.42 | 1.6 | 2.74 | > 0.05 |
| Absolute latency Cc (m.sec.) | 12 | 46.12 | 10.2 | 38 | 36.41 | 4.93 | 10 | 35.54 | 2.24 | 12.89 | *** ≤ 0.001 |

SSEPs Short latency somatosensory evoked potentials.
Lp Lumbar evoked potential.
Cc Cortical evoked potential.
*** Highly significant.

**(3)** Statistical analysis of the results of the neurophysiological studies in RA patients group (I) in comparison to RA patients group (II).

-There is a statistically insignificant difference between the mean distal latency of the right posterior tibial nerve in RA patients group (I) being 5.52 ± 1.26 m.sec. in comparison to 5.09 ± 0.71 m.sec. in RA patients group (II), where T = 1.48 and P > 0.05. Table (16), Histogram (1)

-There is a moderately statistically significant decrease in the mean motor conduction velocity of the right posterior tibial nerve in RA patients group (I) being 44.16 ± 7.49 m/sec. in comparison to 49.57 ± 5.81 m/sec. in RA patients group (II), where T = 2.61 and P ≤ 0.01. Table (16), Histogram (2)

-There is a highly statistically significant delay in the mean distal latency of the left posterior tibial nerve in RA patients group (I) being 5.93 ± 1.15 m.sec. in comparison to 5.08 ± 0.7 m.sec. in RA patients group (II), where T = 3.11 and P ≤ 0.001. Table (16), Histogram (1)

-There is a moderately statistically significant decrease in the mean motor conduction velocity of the left posterior tibial nerve in RA patients group (I) being 43.56 ± 6.26 m/sec. in comparison to 48.07 ± 4.89 m/sec. in RA patients group (II), where T = 2.59 and P ≤ 0.01. Table (16), Histogram (2)

-There is a highly statistically significant delay in the mean latency of the right sural nerve when stimulated antidromically at 10 cm. in RA patients group (I) being 4.49 ± 0.62 m.sec. in comparison to 3.32 ± 0.72 m.sec. in RA patients group (II), where T = 5.02 and P ≤ 0.001. Table (17), Histogram (3)

-There is a highly statistically significant decrease in the mean amplitude of evoked sensory potential of the right sural nerve in RA patients group (I) being 4.59 ± 2.38 μ.V. in comparison to 12.59 ± 6.99 μ.V. in RA patients group (II), where T = 3.86 and P ≤ 0.001. Table (17), Histogram (4)

-There is a highly statistically significant decrease in the mean sensory conduction velocity of the right sural nerve in RA patients group (I) being 22.73 ± 4.03 m/sec. in comparison to 31.45 ± 6.07 m/sec. in RA patients group (II), where T = 4.64 and P ≤ 0.001. Table (17), Histogram (5)

-There is a highly statistically significant delay in the mean latency of the left sural nerve when stimulated antidromically at 10 cm. in RA patients group (I) being 4.5 ± 0.98 m.sec. in comparison to 3.24 ± 0.86 m.sec. in RA patients group (II), where T = 4.23 and P ≤ 0.001. Table (17), Histogram (3)

-There is a highly statistically significant decrease in the mean amplitude of evoked sensory potential of the left sural nerve in RA patients group (I) being 3.85 ± 1.62 μ.V. in comparison to 13.58 ±

6.4 μ.V. in RA patients group (II), where T= 5.17 and P ≤ 0.001. Table (17), Histogram (4)

-There is a highly statistically significant decrease in the mean sensory conduction velocity of the left sural nerve in RA patients group (I) being 23.19 ± 5.18 m/sec. in comparison to 32.29 ± 6.13 m/sec. in RA patients group (II), where T = 4.62 and P ≤ 0.001. Table (17), Histogram (5)

-There is a mildly statistically significant delay in the mean F-wave latency of the right posterior tibial nerve when stimulated at the ankle in RA patients group (I) being 53.26 ± 8.34 m.sec. in comparison to 49.36 ± 3.91 m.sec. in RA patients group (II), where T = 2.23 and P ≤ 0.05. Table (18), Histogram (6)

-There is a mildly statistically significant delay in the mean F-wave latency of the left posterior tibial nerve when stimulated at the ankle in RA patients group (I) being 53.5 ± 4.84 m.sec. in comparison to 51.09 ± 3.73 m.sec. in RA patients group (II), where T = 1.81 and P ≤ 0.05. Table (18), Histogram (6)

-There is a mildly statistically significant delay in the mean absolute latency of the lumbar evoked potential when testing somatosensory evoked potentials for the left posterior tibial nerve in RA patients group (I) being 21.71 ± 3.07 m.sec. in comparison to 20.1 ± 2.41 m.sec. in RA patients group (II), where T= 1.87 and P ≤ 0.05. Table (19), Histogram (7)

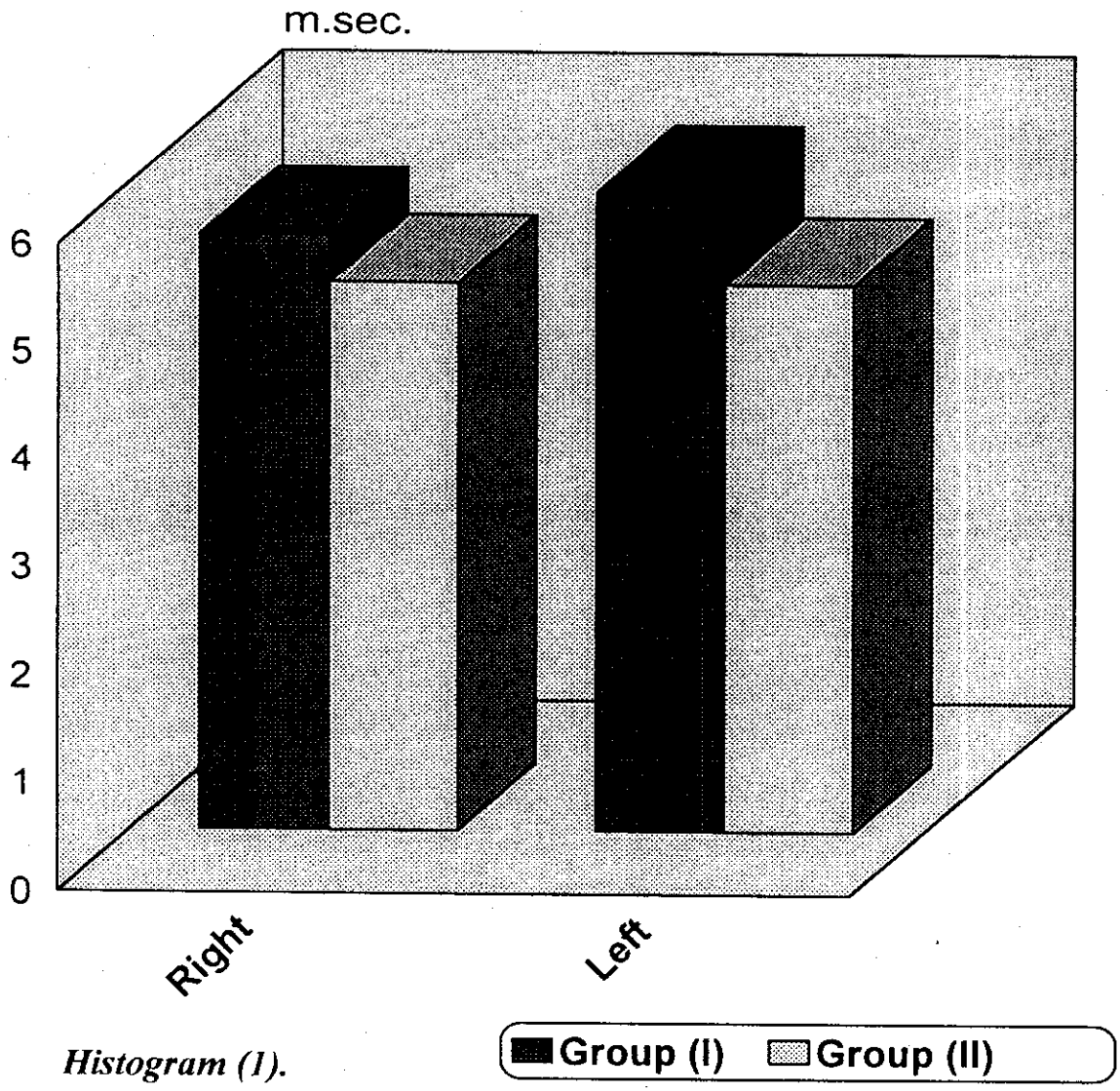
-There is a highly statistically significant delay in the mean absolute latency of the cortical evoked potential when testing somatosensory evoked potentials for the left posterior tibial nerve in RA patients group (I) being 46.12 ± 10.2 m.sec. in comparison to 36.41 ± 4.93 m.sec. in RA patients group (II), where $T = 4.49$ and $P \leq 0.001$. Table (19), Histogram (7)

***Table (16): Comparison between the mean distal latency in m.sec. and motor conduction velocity in m/sec. of the right and left posterior tibial nerves in RA patients with and without RLS.**

| Group<br>*Post. tibial N.* | (I)<br>RA with RLS | | | (II)<br>RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| Rt.<br>distal latency<br>(m.sec.) | 12 | 5.52 | 1.26 | 38 | 5.09 | 0.71 | 1.48 | > 0.05 |
| Rt.<br>MCV<br>(m/sec.) | 12 | 44.16 | 7.49 | 38 | 49.57 | 5.81 | 2.61 | ** ≤ 0.01 |
| Lt.<br>distal latency<br>(m.sec.) | 12 | 5.93 | 1.15 | 38 | 5.08 | 0.7 | 3.11 | *** ≤ 0.001 |
| Lt.<br>MCV<br>(m/sec.) | 12 | 43.56 | 6.26 | 38 | 48.07 | 4.89 | 2.59 | ** ≤ 0.01 |

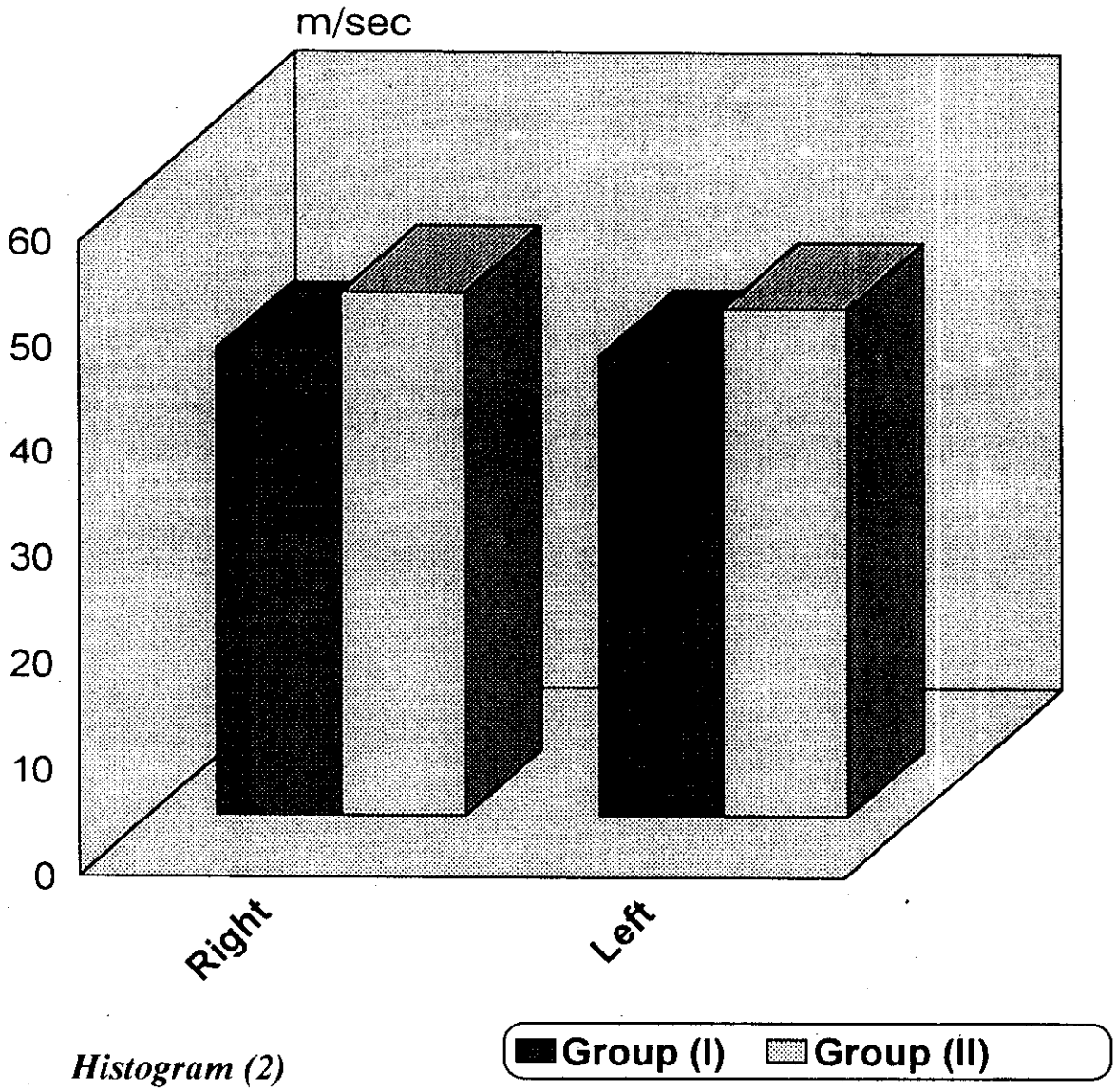
MCV — Motor conduction velocity.
** — Moderately significant.
*** — Highly significant.

*Comparison between the mean distal latency in m.sec. of the right and left posterior tibial nerves in RA patients with and without RLS*




*Histogram (1).*

*Comparison between the mean motor conduction velocity in m/sec. of the right and left posterior tibial nerves in RA patients with and without RLS*



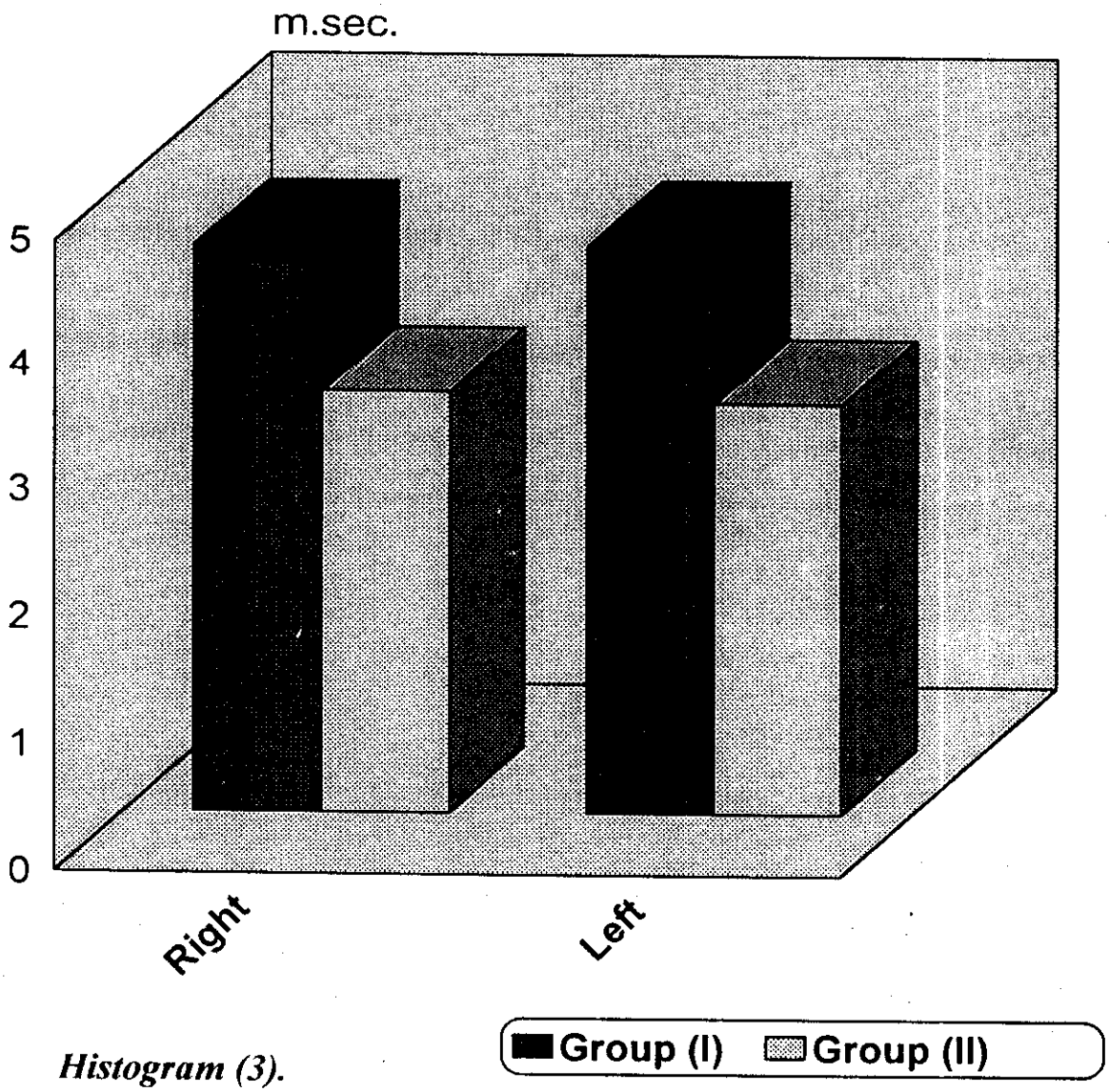

*Histogram (2)*

*Table (17): Comparison between the mean latency at 10 cm. in m.sec., amplitude of evoked sensory potential in μ.V. and sensory conduction velocity in m/sec. of the right and left sural nerves in RA patients with and without RLS.

| Group *Sural N.* | (I) RA with RLS | | | (II) RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| Rt. latency at 10 cm. (m.sec.) | 12 | 4.49 | 0.62 | 38 | 3.32 | 0.72 | 5.02 | *** ≤ 0.001 |
| Rt. AESP (μ.V.) | 12 | 4.59 | 2.38 | 38 | 12.59 | 6.99 | 3.86 | *** ≤ 0.001 |
| Rt. SCV (m/sec.) | 12 | 22.73 | 4.03 | 38 | 31.45 | 6.07 | 4.64 | *** ≤ 0.001 |
| Lt. latency at 10 cm. (m.sec.) | 12 | 4.5 | 0.98 | 38 | 3.24 | 0.86 | 4.23 | *** ≤ 0.001 |
| Lt. AESP (μ.V.) | 12 | 3.85 | 1.62 | 38 | 13.58 | 6.4 | 5.17 | *** ≤ 0.001 |
| Lt. SCV (m/sec.) | 12 | 23.19 | 5.18 | 38 | 32.29 | 6.13 | 4.62 | *** ≤ 0.001 |

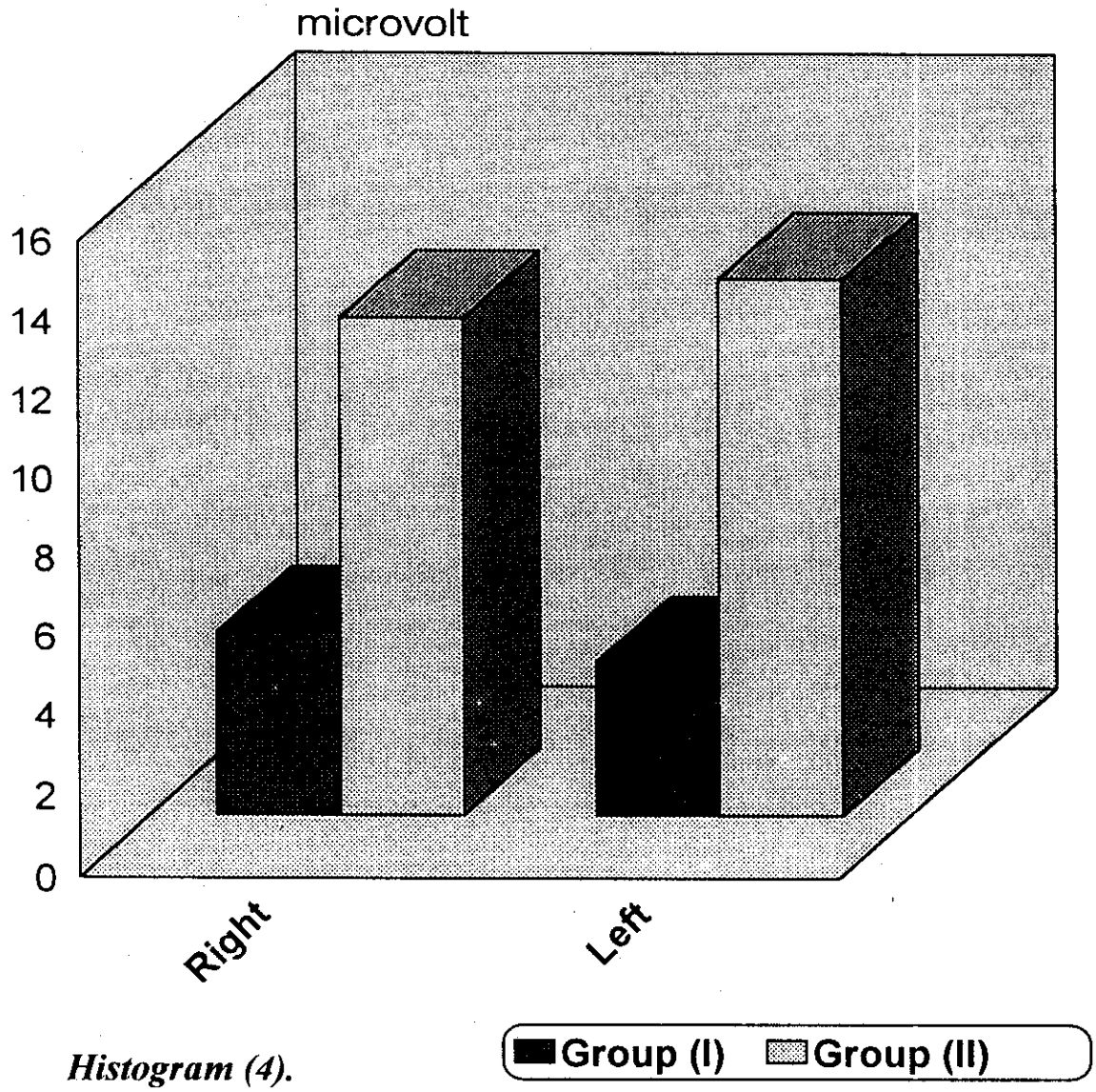
AESP — Amplitude of evoked sensory potential.
SCV — Sensory conduction velocity.
*** — Highly significant.

## *Comparison between the mean latency at 10 cm. in m.sec. of the right and left sural nerves in RA patients with and without RLS*



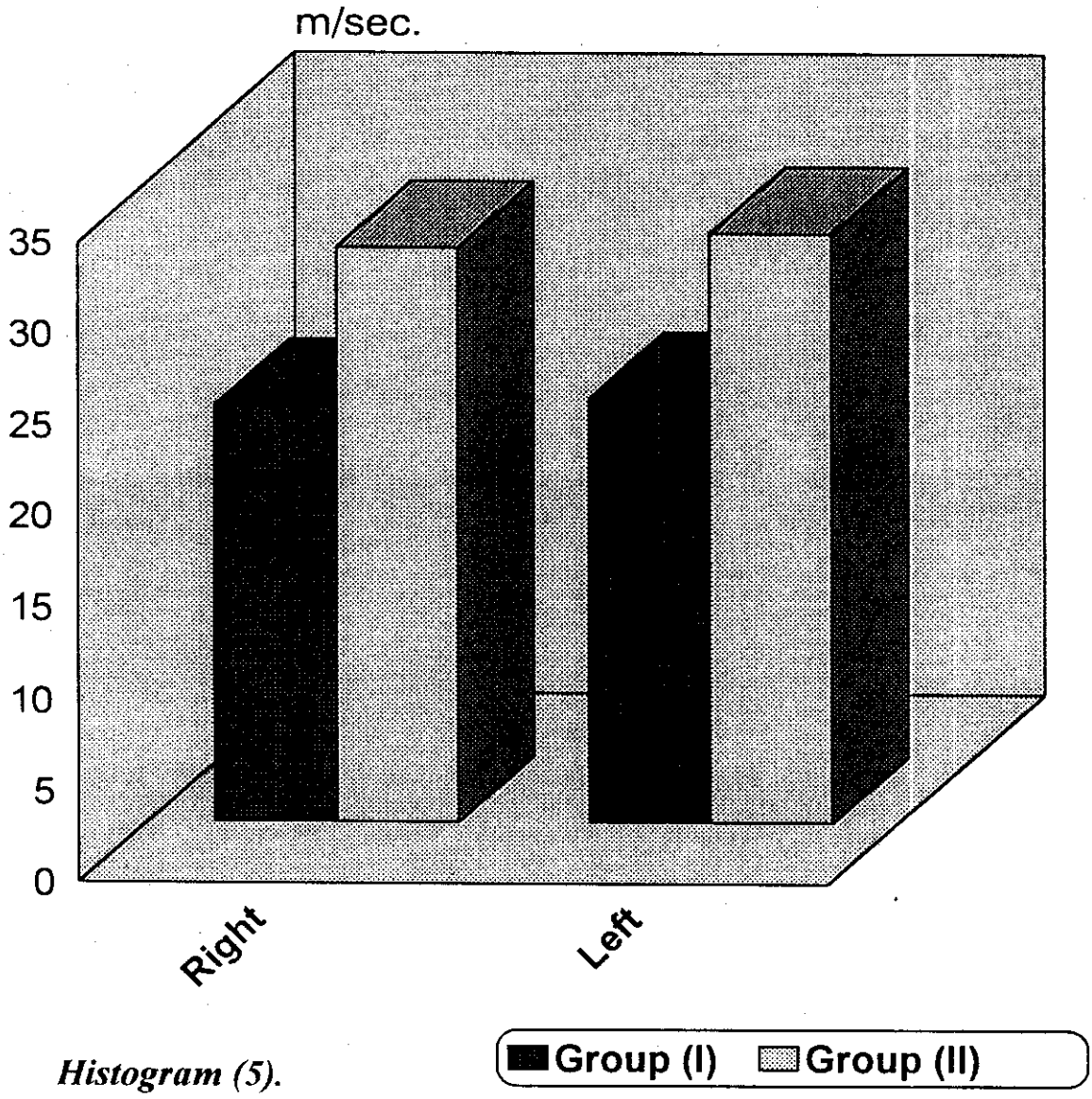

*Histogram (3).*

*Comparison between the mean amplitude of evoked sensory potential in microvolt of the right and left sural nerves in RA patients with and without RLS*




*Histogram (4).*

## *Comparison between the mean sensory conduction velocity in m/sec. of the right and left sural nerves in RA patients with and without RLS*



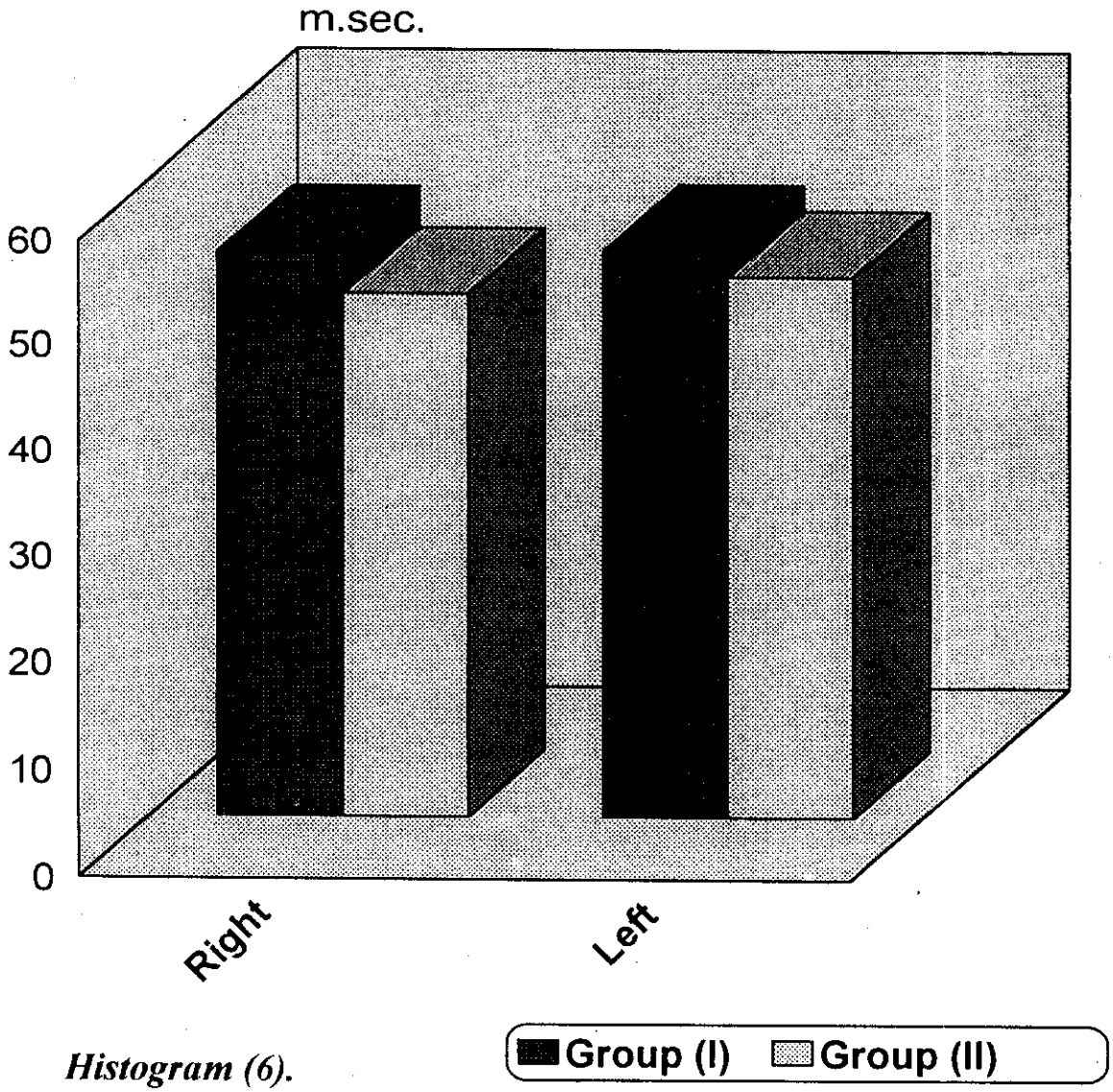

*Histogram (5).*

***Table (18): Comparison between the mean F-wave latency in m.sec. of the right and left posterior tibial nerves stimulated at the ankle in RA patients with and without RLS.**

| Group<br>*Post. tibial N. at the ankle* | (I)<br>RA with RLS | | | (II)<br>RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| Rt.<br>F-wave latency<br>(m.sec.) | 12 | 53.26 | 8.34 | 38 | 49.36 | 3.91 | 2.23 | *≤ 0.05 |
| Lt.<br>F-wave latency<br>(m.sec.) | 12 | 53.5 | 4.84 | 38 | 51.09 | 3.73 | 1.81 | *≤ 0.05 |

* Mildly significant.

*Comparison between the mean F-wave latency in m.sec. of the right and left post. tibial nerves stimulated at the ankle in RA patients with and without RLS*



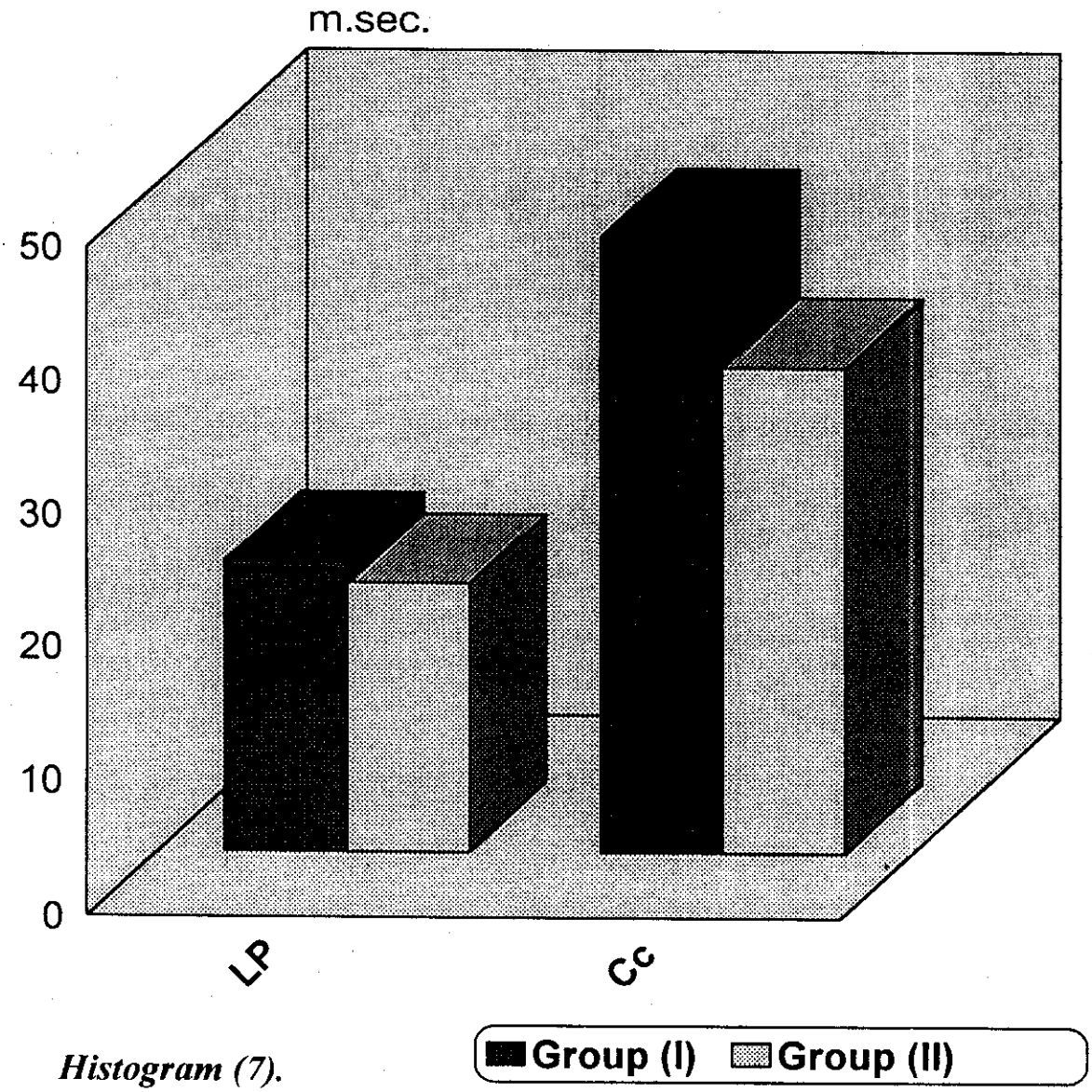

*Histogram (6).*

***Table (19): Comparison between the mean absolute latency in m.sec. of SSEPs for left posterior tibial nerve in RA patients with and without RLS.**

| Group<br>*Left post. tibial N.*<br>*SSEPs* | (I)<br>RA with RLS | | | (II)<br>RA without RLS | | | T | P |
|---|---|---|---|---|---|---|---|---|
| | N | X` | ± SD | N | X` | ± SD | | |
| Absolute latency<br>LP<br>(m.sec.) | 12 | 21.71 | 3.07 | 38 | 20.1 | 2.41 | 1.87 | $^{*}\leq 0.05$ |
| Absolute latency<br>Cc<br>(m.sec.) | 12 | 46.12 | 10.2 | 38 | 36.41 | 4.93 | 4.49 | $^{***}\leq 0.001$ |

SSEPs Short latency somatosensory evoked potentials.
LP Lumbar evoked potentials.
Cc Cortical evoked potentials.
* Mildly significant.
*** Highly significant.

## *Comparison between the mean absolute latency in m.sec. of SSEPs for left post. tibial nerve in RA patients with and without RLS*




*Histogram (7).*

***Table (20): Shows correlation coefficients between the results of clinical and laboratory variables of RA patients group (I).**

-There are statistically significant positive correlations between the levels of E.S.R. and durations of morning stiffness, articular indices, visual analogue scales and clinical spread / severity indices, where $P \leq 0.05$. Also there are statistically significant negative correlations between the levels of ESR and degrees of grip strength of the right and left hands, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the levels of haemoglobin and degrees of grip strength of the right hands, where $P \leq 0.05$. Also there is a statistically significant negative correlation between the levels of haemoglobin and durations of morning stiffness, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the levels of serum ferritin and degrees of grip strength of the left hands, where $P \leq 0.05$.

-There are statistically significant positive correlations between the levels of C-reactive protein and durations of morning stiffness, articular indices, visual analogue scales and clinical spread / severity indices, where $P \leq 0.05$. Also there are statistically significant negative correlations between the levels of C-reactive protein and degrees of grip strength of the right and left hands, where $P \leq 0.05$.

-There are statistically significant negative correlations between the levels of 2-hours post prandial blood glucose and durations of morning stiffness, articular indices, where $P \leq 0.05$. Also there is a statistically significant positive correlation between the levels of 2-hours post prandial blood glucose and degrees of grip strength of the left hands, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the levels of serum creatinine and degrees of grip strength of the left hands, where $P \leq 0.05$.

***Table (20): Correlation coefficients between the clinical and laboratory variables of RA patients with RLS.**

| Clinical / *Laboratory* | Duration | Age | M.S. | A.I. | G.S. | | V.A.S. | C.S.S.I |
|---|---|---|---|---|---|---|---|---|
| | | | | | *Rt.* | *Left* | | |
| ESR | - 0.1 | - 0.38 | *0.89 | *0.85 | *- 0.71 | *-0.49 | *0.76 | *0.82 |
| Hb. | - 0.27 | 0.24 | *-0.54 | - 0.41 | *0.63 | 0.45 | - 0.37 | - 0.38 |
| S. Ferritin | 0.02 | 0.24 | - 0.25 | - 0.2 | 0.43 | *0.6 | - 0.27 | - 0.1 |
| C-reactive protein | - 0.22 | - 0.03 | *0.84 | *0.72 | *- 0.68 | *- 0.62 | *0.59 | *0.77 |
| Fasting blood glucose | 0.3 | - 0.1 | - 0.2 | - 0.32 | 0.42 | 0.21 | - 0.32 | - 0.36 |
| 2hp.p. glucose | 0.48 | 0.45 | *- 0.54 | *- 0.6 | 0.45 | *0.56 | - 0.45 | - 0.45 |
| S. Creatinine | - 0.15 | 0.11 | 0.48 | 0.25 | - 0.43 | *-0.74 | 0.17 | 0.3 |
| S. $Ca^{+}$ | - 0.4 | 0.21 | 0.11 | 0.14 | - 0.16 | - 0.43 | 0.2 | 0.32 |
| S. $Mg^{++}$ | 0.0 | 0.17 | 0.1 | - 0.15 | 0.15 | - 0.13 | - 0.38 | - 0.03 |

**M.S.** Morning stiffness.
**A.I** Articular index.
**G.S.** Grip strength.
**V.A.S.** Visual analogue scale.
**C.S.S.I.** Clinical spread / severity index.
**E.S.R.** Erythrocyte sedimentation rate.
**Hb.** Haemoglobin.
**Critical value = 0.49**
* Significant correlation $P \leq 0.05$.

***Table (21): Shows correlation coefficients between the results of laboratory variables and neurophysiological studies of RA patients group (I).**

-There is a statistically significant negative correlation between the distal latencies of the right posterior tibial nerve and levels of total serum calcium, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the latencies of the right sural nerve when stimulated antidromically at 10 cm. and levels of serum ferritin, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the sensory conduction velocities of the right sural nerve and levels of serum ferritin, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the amplitudes of evoked sensory potentials of the left sural nerve and levels of ESR, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the F-wave latencies of the right posterior tibial nerve when stimulated at the ankle and levels of ESR, where $P \leq 0.05$. Also there is a statistically significant negative correlation between the F-wave latencies of the right posterior tibial nerve when stimulated at the ankle and levels of haemoglobin, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the F-wave latencies of the left posterior tibial nerve when stimulated at the ankle and levels C-reactive protein, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the absolute latencies of the cortical evoked potentials when testing somatosensory evoked potentials for the left posterior tibial nerve and levels of serum magnesium, where $P \leq 0.05$.

**Table (21): Correlation coefficients between laboratory variables and neurophysiological studies of RA patients with RLS.**

| Laboratory / *N.Physiologic* | ESR | Hb. | S. Ferritin | C-reactive protein | Blood glucose | | S. $Ca^{++}$ | S. $Mg^{++}$ | S. Creatinine |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | *Fasting* | *2 h.p.p.* | | | |
| Rt. distal latency | 0.0 | - 0.06 | -0.27 | -0.02 | 0.18 | -0.09 | *-0.63 | 0.15 | 0.27 |
| Rt. MCV | 0.05 | 0.17 | 0.33 | -0.04 | 0.05 | 0.03 | -0.31 | 0.11 | -0.23 |
| Lt. distal latency | - 0.13 | 0.17 | 0.33 | -0.08 | -0.19 | -0.45 | -0.40 | -0.37 | -0.16 |
| Lt. MCV | 0.32 | - 0.41 | 0.01 | 0.06 | 0.26 | 0.01 | -0.03 | -.37 | 0.01 |
| Rt. latency at 10 cm. | 0.02 | 0.06 | *-0.54 | -0.12 | -0.16 | 0.35 | 0.25 | -0.03 | -0.34 |
| Rt. AESP | - 0.11 | 0.17 | -0.33 | -0.07 | 0.19 | -0.17 | -0.16 | 0.21 | 0.20 |
| Rt. SCV | - 0.01 | 0.0 | *0.51 | 0.07 | 0.15 | -0.35 | -0.28 | 0.03 | 0.31 |
| Lt. latency at 10 cm. | 0.37 | -0.22 | 0.03 | 0.26 | -0.21 | -0.3 | 0.26 | -0.13 | -0.06 |
| Lt. AESP | *- 0.53 | 0.17 | 0.15 | -0.26 | 0.2 | 0.48 | -0.44 | 0.06 | -0.02 |
| Lt. SCV | - 0.39 | 0.21 | 0.03 | -0.27 | 0.25 | 0.32 | -0.31 | 0.18 | 0.07 |
| Rt. F-wave latency | *0.57 | *-0.71 | - 0.48 | 0.28 | 0.02 | -0.33 | -0.34 | -0.15 | *0.50 |
| Lt. F-wave latency | 0.39 | -0.3 | - 0.06 | *0.63 | -0.23 | -0.16 | -0.38 | -0.27 | 0.22 |
| Absolute latency LP | 0.09 | -0.21 | - 0.19 | 0.22 | 0.0 | 0.04 | 0.03 | -0.32 | 0.26 |
| Absolute latency Cc | 0.25 | 0.13 | 0.2 | 0.09 | -0.41 | 0.02 | -0.1 | *-0.56 | -0.31 |

**Critical value = 0.49**

* **Significant correlation $P \leq 0.05$.**

***Table (22): Shows correlation coefficients between the clinical variables and neurophysiological studies of RA patients group (I).**

-There is a statistically significant negative correlation between the motor conduction velocities of the left posterior tibial nerve and ages, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the amplitudes of evoked sensory potentials of the left sural nerve and ages, where $P \leq 0.05$. Also there is a statistically significant negative correlation between the amplitudes of the evoked sensory potentials of the left sural nerve and articular indices, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the F-wave latencies of the right posterior tibial nerve when stimulated at the ankle and degrees of grip strength of the right hands, where $P \leq 0.05$.

-There is a statistically significant negative correlation between the F-wave latencies of the left posterior tibial nerve when stimulated at the ankle and degrees of grip strength of the right hands, where $P \leq 0.05$.

-There is a statistically significant positive correlation between the absolute latencies of the cortical evoked potentials when testing somatosensory evoked potentials for the left posterior tibial nerve and visual analogue scales, where $P \leq 0.05$.

***Table (22): Correlation coefficients between the clinical variables and neurophysiological studies of RA patients with RLS.**

| Clinical / *N.Physiologic* | Duration | Age | M.S. | A.I. | G.S. | | V.A.S. | C.S.S.I. |
|---|---|---|---|---|---|---|---|---|
| | | | | | *Rt.* | *Left* | | |
| Rt. distal latency | 0.21 | 0.18 | -0.12 | -0.27 | -0.01 | -0.09 | -0.2 | -0.3 |
| Rt. MCV | -0.17 | -0.35 | 0.13 | 0.2 | 0.46 | 0.39 | 0.0 | 0.16 |
| Lt. distal latency | -0.18 | -0.38 | -0.21 | -0.07 | 0.15 | 0.08 | -0.18 | -0.33 |
| Lt. MCV | 0.06 | *-0.58 | 0.26 | 0.21 | 0.1 | 0.26 | -0.1 | 0.14 |
| Rt. latency at 10 cm. | -0.19 | -0.09 | 0.09 | 0.18 | -0.11 | 0.19 | 0.0 | 0.27 |
| Rt. AESP | 0.11 | 0.17 | -0.24 | -0.35 | 0.21 | -0.08 | -0.18 | -0.34 |
| Rt. SCV | 0.15 | 0.08 | -0.12 | -0.2 | 0.11 | -0.17 | -0.02 | -0.28 |
| Lt. latency at 10 cm. | -0.14 | -0.47 | 0.33 | 0.4 | 0.08 | 0.14 | 0.2 | 0.32 |
| Lt. AESP | 0.4 | *0.55 | 0.45 | *-0.54 | 0.07 | 0.07 | -0.32 | -0.48 |
| Left SCV | 0.14 | 0.44 | -0.35 | -0.43 | -0.03 | -0.1 | -0.28 | -0.37 |
| Rt. F-wave latency | 0.21 | 0.0 | 0.4 | 0.32 | *-0.53 | -0.45 | 0.43 | 0.26 |
| Lt. F-wave latency | 0.18 | 0.08 | 0.46 | 0.38 | *-0.52 | -0.12 | 0.39 | 0.42 |
| Absolute latency LP | 0.41 | 0.46 | 0.06 | 0.03 | -0.37 | -0.27 | 0.48 | 0.14 |
| Absolute latency Cc | 0.2 | 0.15 | 0.12 | 0.23 | -0.37 | 0.08 | *0.56 | 0.33 |

Critical value = 0.49

* Significant correlation $P \leq 0.05$.

## *Clinical interpretation of the results of the neurophysiological studies:

-Table (23): shows RA patients group (I) with motor peripheral neuropathy. They were 5 out of 12 (41.66%).

-Table (24): shows RA patients group (II) with motor peripheral neuropathy. They were 3 out of 38 (7.89%).

-Table (25): shows RA patients group (I) with sensory peripheral neuropathy. All the patients were affected (100%).

-Table (26): shows RA patients group (II) with sensory peripheral neuropathy. They were 24 out of 38 (63.15%).

-Table (27): shows RA patients group (I) with localized anterior root affection. They were 4 out of 12 (33.33%).

-Table (28): shows RA patients group (II) with localized anterior root affection. They were 10 out of 38 (26.31%).

-Table (29): shows RA patients group (I) with deep sensory affection. They were 8 out of 12 (66.66%). Two patients with localized posterior root affection, 4 patients with central affection of the deep sensation and two patients had both.

-Table (30): shows RA patients group (II) with deep sensory affection. They were 4 out of 38 (10.52%). Three patients with localized posterior root affection and one patient with central affection of the deep sensation.

***Table (23): RA patients group (I) with motor peripheral neuropathy.**

| Patient number | Rt. distal latency (m.sec.) | Rt. MCV (m/sec.) | Lt. distal latency (m.sec.) | Lt. MCV (m/sec.) |
|---|---|---|---|---|
| 3 | 8.88 | 35.90 | 8.16 | 37.30 |
| 6 | 5.94 | 35.40 | 5.94 | 38.00 |
| 7 | 4.80 | 46.10 | 6.30 | 36.40 |
| 10 | 6.20 | 35.90 | 5.50 | 48.00 |
| 11 | 6.60 | 35.40 | 6.24 | 38.90 |

Delay in latency.

Decrease in motor conduction velocity.

***Table (24): RA patients group (II) with motor peripheral neuropathy.**

| Patient number | Rt. distal latency (m.sec.) | Rt. MCV (m/sec.) | Lt. distal latency (m.sec.) | Lt. MCV (m/sec.) |
|---|---|---|---|---|
| 5 | 5.40 | 41.60 | 5.20 | 44.00 |
| 7 | 5.80 | 45.70 | 7.70 | 38.00 |
| 19 | 6.60 | 39.40 | 6.60 | 35.60 |

Delay in latency.

Decrease in motor conduction velocity.

***Table (25): RA patients group (I) with sensory peripheral neuropathy.**

| Patient number | Rt. latency at 10 cm. (m.sec.) | Rt. AESP (μ.V.) | Rt. SCV (m/sec.) | Lt. latency at 10 cm. (m.sec.) | Lt. AESP (μ.V.) | Lt. SCV (m/sec.) |
|---|---|---|---|---|---|---|
| 1 | 4.38 | 3.50 | 22.80 | 5.58 | 2.20 | 17.90 |
| 2 | 5.20 | 3.20 | 19.20 | 5.44 | 2.50 | 18.30 |
| 3 | 2.91 | 12.00 | 34.30 | 3.34 | 4.70 | 29.90 |
| 4 | 4.65 | 4.80 | 21.50 | 3.48 | 5.00 | 28.70 |
| 5 | 4.92 | 4.50 | 20.30 | 4.69 | 3.50 | 21.30 |
| 6 | 4.00 | 3.90 | 25.00 | 3.81 | 5.80 | 26.20 |
| 7 | 4.31 | 3.20 | 23.20 | 4.38 | 3.50 | 22.80 |
| 8 | 4.50 | 4.50 | 22.20 | 5.84 | 2.50 | 17.10 |
| 9 | 4.62 | 4.20 | 21.60 | 5.31 | 2.60 | 18.80 |
| 10 | 5.37 | 3.50 | 18.60 | 3.46 | 4.00 | 28.90 |
| 11 | 4.44 | 3.80 | 22.50 | 3.34 | 7.50 | 29.90 |
| 12 | 4.62 | 4.00 | 21.60 | 5.40 | 2.50 | 18.50 |

Delay in latency.

Decrease in amplitude of evoked sensory potential.

Decrease in sensory conduction velocity.

***Table (26): RA patients group (II) with sensory peripheral neuropathy.**

| Patient number | Rt. latency at 10 cm. (m.sec.) | Rt. AESP (μ.V.) | Rt. SCV (m/sec.) | Lt. latency at 10 cm. (m.sec.) | Lt. AESP (μ.V.) | Lt. SCV (m/sec.) |
|---|---|---|---|---|---|---|
| 1 | 3.12 | 19.00 | 34.20 | 5.69 | 3.50 | 17.70 |
| 2 | 4.80 | 4.50 | 20.80 | 5.72 | 3.60 | 17.48 |
| 4 | 3.08 | 15.00 | 32.40 | 2.74 | 14.00 | 36.40 |
| 5 | 3.12 | 11.00 | 32.00 | 3.36 | 6.50 | 29.70 |
| 6 | 3.87 | 5.80 | 25.80 | 3.46 | 5.00 | 28.90 |
| 7 | 4.09 | 12.50 | 24.40 | 3.61 | 15.20 | 27.70 |
| 8 | 3.48 | 10.00 | 28.70 | 2.76 | 12.00 | 36.20 |
| 9 | 3.26 | 12.00 | 30.60 | 2.92 | 22.00 | 34.20 |
| 11 | 3.40 | 4.50 | 29.40 | 2.62 | 22.00 | 38.10 |
| 13 | 3.56 | 3.20 | 28.08 | 6.08 | 2.50 | 16.44 |
| 15 | 5.55 | 2.50 | 18.00 | 4.27 | 4.00 | 23.40 |
| 16 | 3.31 | 10.00 | 30.20 | 2.82 | 19.00 | 35.40 |
| 18 | 3.16 | 20.00 | 39.00 | 3.44 | 4.00 | 29.00 |
| 19 | 3.89 | 4.60 | 25.70 | 3.24 | 13.10 | 30.80 |
| 21 | 3.07 | 17.00 | 32.50 | 3.34 | 3.90 | 29.90 |
| 23 | 3.46 | 16.00 | 28.90 | 3.16 | 17.00 | 31.60 |
| 25 | 4.83 | 3.20 | 20.70 | 4.03 | 3.50 | 24.80 |
| 26 | 3.35 | 17.00 | 29.80 | 3.10 | 22.00 | 32.20 |
| 28 | 3.31 | 4.10 | 30.20 | 3.10 | 14.00 | 31.90 |
| 29 | 3.38 | 5.60 | 29.50 | 2.97 | 16.00 | 33.60 |
| 34 | 3.36 | 4.50 | 29.70 | 3.27 | 10.00 | 30.50 |
| 35 | 3.36 | 2.20 | 22.10 | 3.23 | 12.00 | 30.90 |
| 36 | 4.52 | 5.00 | 23.50 | 3.32 | 14.00 | 30.10 |
| 38 | 3.26 | 13.00 | 30.60 | 2.89 | 15.00 | 34.50 |

Delay in latency.

Decrease in amplitude of evoked sensory potential.

Decrease in sensory conduction velocity.

***Table (27): RA patients group (I) with localized anterior root affection.**

| Patient number | Rt. F-wave latency (m.sec.) | Lt. F-wave latency (m.sec.) |
|---|---|---|
| 6 | 64.80 | 62.50 |
| 7 | 62.60 | 49.00 |
| 9 | 63.60 | 49.30 |
| 12 | 55.30 | 60.90 |

Delay in latency.

***Table (28): RA patients group (II) with localized anterior root affection.**

| Patient number | Rt. F-wave latency (m.sec.) | Lt. F-wave latency (m.sec.) |
|---|---|---|
| 3 | 53.20 | 59.60 |
| 5 | 46.40 | 57.20 |
| 7 | 55.60 | 50.70 |
| 9 | 45.00 | 59.60 |
| 13 | 57.60 | 50.80 |
| 19 | 55.80 | 49.50 |
| 20 | 53.60 | 45.50 |
| 24 | 53.60 | 57.20 |
| 32 | 56.20 | 49.60 |
| 37 | 55.80 | 47.90 |

Delay in latency.

***Table (29): RA patients group (I) with deep sensory affection.**

| Patient number | Absolute latency Lp (m.sec.) | Absolute latency Cc (m.sec.) |
|---|---|---|
| 2 | 19.60 | 56.80 |
| 3 | 19.00 | 45.00 |
| 5 | 23.00 | 47.60 |
| 6 | 29.40 | 59.00 |
| 7 | 23.00 | 41.80 |
| 9 | 23.16 | 36.80 |
| 10 | 19.60 | 56.80 |
| 12 | 22.40 | 44.80 |

Delay in absolute latency.

***Table (30): RA patients group (II) with deep sensory affection.**

| Patient number | Absolute latency Lp (m.sec.) | Absolute latency Cc (m.sec.) |
|---|---|---|
| 9 | 24.80 | 42.00 |
| 17 | 21.20 | 51.00 |
| 29 | 22.90 | 40.70 |
| 30 | 23.50 | 41.00 |

Delay in absolute latency.