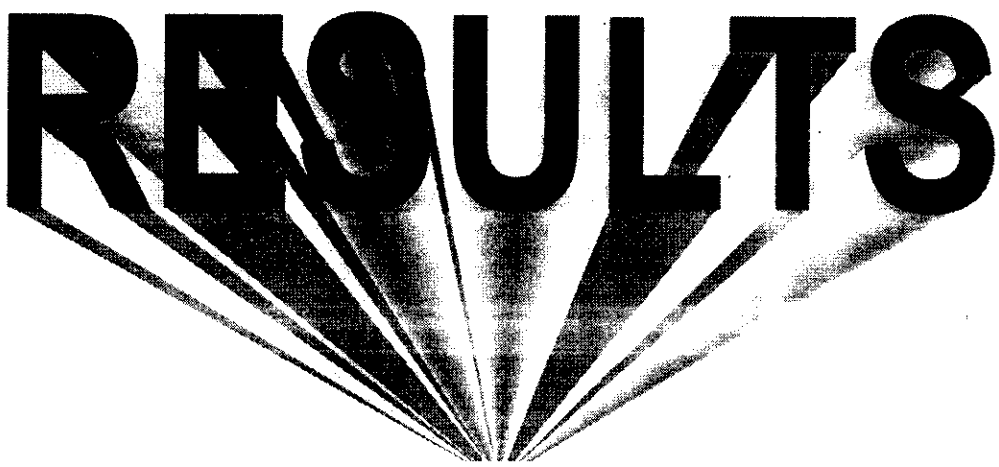

RESULTS

RESULTS

Cases were classified into three groups A, B and C according to forty full score, group A comprised cases with end score 30 or more, i.e. good recovery, group B included cases with end score from 15 to 29 i.e. partial recovery while group C comprised cases with score less than 15 i.e. poor recovery. Group A was 13 cases, Group B was 9 and group C was 8 cases.

The mean age in group A was 40 years, in group B was 35.3 years and in group C was 32.4 years. In comparing the three groups with each other (table 5) age was an insignificant measure.

Table (5) : Comparison between the studied groups regarding age

Age / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
A	40.0s	± 9.9	A×B	1.197	>0.05
B	35.3	± 7.4	A×C	1.728	>0.05
C	32.4	± 9.7	B×C	0.708	>0.05

According to gender distribution, group A was 5 males and 8 females, group B was 5 males and 4 females while group C was 5 males and 3 females (table 6). Chi square was 1.30 and p value was more than 0.05 i.e. insignificant

Table (6) Gender distribution of the studied groups

Sex / Studied group	Male		Female		total	
	No	%	No.	%	No	%
Group A	5	38.5	8	61.5	13	100
Group B	5	55.56	4	44.44	9	100
Group C	5	62.5	3.	37.5	8	100
Total	15	50	15	50	30	100

Chi square (x^2)=1.30 p>0.05

On studying etiology in the three groups idiopathic (Bell's) palsy was the main cause in groups A(84.7%) and B(77.9%) while traumatic paralysis was the main cause in group C(Table 7 and Figure 19). This means that idiopathic paralysis is prognostically better than traumatic and inflammatory causes. Traumatic cases were the majority among badly prognostic cases. Chi square was 13.279 and p value was less than 0.01 i.e. highly significant.

Table (7) Etiology of facial nerve injury among the studied groups

Etiology / Studied group	Idiopathic		Traumatic		Inflammatory		Total	
	No	%	No	%	No.	%	No	%
Group A	11	84.7	1	7.7	1	7.7	13	100
Group B	7	77.9	1	11.1	1	11.1	9	100
Group C	2	25	6	75	0	0	8	100
Total	20	66.7	8	26.7	8	26.7	30	100

Chi square (X_2)= 13.279

P <0.01

Tables from 8 to 13 compares mean of motor score in the three groups along the six sessions of study. In table (8) mean of score was 14.5 in group B, 11.5 in group A and 8.1 in group C. The three comparisons were insignificant

Table (8) comparison between the studied groups regarding motor score at first session

Age / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
Group A	11.5	± 6.6	A×B	1.13	>0.05
Group B	14.5	± 4.6	A×C	1.06	>0.05
Group C	8.1	±7	B×C	1.15	>0.05

Table (9) comparison between the studied groups according to motor score at second session

score / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
Group A	13.08	± 5.2	A×B	-2.06	<0.05
Group B	17.22	± 3.6	A×C	2.51	<0.05
Group C	6.88	±5.9	B×C	4.39	<0.01

In table (9) mean score of group B was 17.22, group A was 13.08 and it was 6.88 in group C. Comparison between groups A and B was significant towards group B. The comparison was also significant between group A and C and highly significant between group B and C.

Table(10) Motor score (3 rd session)

Score / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
Group A	17.7	±5.63	A×B	-1.21	>0.05
Group B	20	0.00	A×C	3.66	<0.01
Group C	7.5	± 7.1	B×C	5.33	<0.01

In table (10) mean score of group B was 20, 17.7 for group A and 7.5 for group C. Comparison between groups A and B was insignificant. The other 2 comparisons were highly significant.

Table (11) Motor score (4th session)

score / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
Group A	21.15	± **5.06**	A×B	3.14	<0.05
Group B	15.2	±**3.53**	A×C	5.6	<0.01
Group C	7.5	± **5.98**	B×C	3.19	<0.05

In table (11) the mean of score for group A was 21.15, while it was 15.2 in group B and 7.5 in group C. Comparison between group A and B started to be significant towards group (A). The comparison between groups A and C was highly significant and significant between groups B and C

Table (12) Motor score(5th session)

Score / Studied group	$\bar{X}$	±SD	Test of significance		
			Group	T	P
Group A	26.53	±**4.3**	A×B	5.15	<0.01
Group B	18.33	± **2.5**	A×C	10.42	<0.01
Group C	6.25	±**4.43**	B×C	7.34	<0.01

Table (13) Motor score(6th session)

score / Studied group	$\overline{X}$	±SD	Test of significance		
			Group	**T**	**P**
Group A	36.15	**±3.6**	A×B	12.75	<0.01
Group B	18.33	**± 2.5**	A×C	19.03	<0.01
Group C	8.75	**±2.31**	**B×C**	8.17	<0.01

Comparison between groups according to motor score was insignificant during first session and mean of group B was higher than group A during first, second and third sessions. Statistical analysis became significant from the second session and started to be highly significant from third session.

Table(14) Motor score improvement along sessions

group / motor score		A	B	C
1st Session	$\bar{X}$	11.54	14.44	8.125
	SD	± 6.58	± 4.6	± 7
2nd Session	$\bar{X}$	13.78	17.22	6.875
	SD	± 5.22	± 3.6	± 5.9
3rd Session	$\bar{X}$	17.69	20	7.5
	SD	± 5.63	0.00	± 7.1
4th Session	$\bar{X}$	21.15	15	7.5
	SD	± 5.06	± 3.53	± 5.98
5th Session	$\bar{X}$	26.54	18.38	6.25
	SD	± 4.28	± 2.5	±4.43
6th Session	$\bar{X}$	36.15	18.33	8.75
	SD	± 3.62	± 2.5	± 2.31
Test of significance	F	41.481	4.130	0.179
	P	< 0.01	< 0.05	> 0.05

This is confirmed in table (14) and figure (20) by studying change of motor score along sessions. In group A mean of score at first session was 11.54 and gradually increased to 36.15 on the last session the F ratio of this change was 41.481 and P value was <0.01 i.e. highly significant. In group B mean of score at first session was 14.44 and 18.33 at last session. The F ratio was 4.130 and P value was <0.05 i.e. significant . In case of group C mean was 8.125 at first session and 8.75 at last session. The F ratio was 0.179 and P value was > 0.05 i.e. insignificant.

It was highly significant in group A, significant in group B and insignificant in group C.

Hyperacusis (Table 15) was absent in most of cases (76.92%) with good recovery i.e. group A at first session but comparison between groups was statistically insignificant.

Table (15) Distribution of studied groups regarding hyperacusis at 1st session

hyperacusis / Studied group	Present		Absent		Total	
	No	%	No	%	No.	%
Group A	3	23.8	10	76.92	13	43.33
Group B	6	66.67	3	33.33	9	30.00
Group C	4	50	4	50	8	26.67
Total	13	43.33	17	56.67	30	100

X^2=4.313
P>0.05

Taste affection was found to be absent also in most of cases (69.23%) with good recovery (group A) at first session. However comparison between groups was statistically insignificant (table16).

Table (16) Distribution of studied groups regarding taste affection at 1st session

taste / Studied group	Absent		Present		Total	
	No	%	No	%	No.	%
Group A	9	69.23	4	30.77	13	43.33
Group B	3	33.33	6	66.67	9	30
Group C	3	37.5	5	62.5	8	26.67
Total	15	50	15	50	30	100

X^2=4.423
P>0.05

Hyperkinetic disorders were studied at last session and were found in 14 cases, 7 cases were encountered among group C. Comparison between groups was also statistically insignificant (table 17).

Table (17) Distribution of studied groups regarding hyperkinetic disorders (at last session)

Hyper kinetic / Studied group	Present		Absent		Total	
	No	%	No	%	No.	%
Group A	5	38.46	8	61.54	13	43.33
Group B	4	44.44	5	55.56	9	30
Group C	7	87.5	1	12.5	8	26.67
Total	16	53.33	14	46.67	30	100

X^2=5.193

P>0.05

Acoustic reflex was studied according to first session examination and according to improvement.On first examination acoustic reflex (table 18) was intact in most of cases (91.66%) with good recovery in. group A. It was intact in case of group B(14.29%) and in 2 cases in group C (40%)Comparison between the three study groups showed high statistically significant difference. Accordingly, acoustic reflex can have the possibility to be a prognostic measure.

Table (18) Distribution of the studied groups regarding acoustic reflex at the beginning of study

A. reflex / Studied group	Present		Absent		Total	
	No	%	No	%	No.	%
Group A	11	91.66	1	8.33	12	100
Group B	1	14.29	6	85.70	7	100
Group C	2	40	3	60	5	100
Total	14	58.33	10	41.66	24	100

Chi square =10.114

P< 0.01

Percentage of the positive cases of acoustic reflex was increasing especially in groups B and C; This proportion of increase was statistically significant in groups B and C(moderate or poor recovery) while it was statistically insignificant in group A (Table 19).

Table (19): Comparing positivity of a coustic reflex along study time

Positvee / Studied group	First study		Midstudy		End study		Test of proportion	
	No	%	No	%	No	%	Ztest	p
A(n.=12)	11	91.66	12	100	12	100	1.020	>0.05
B(n.=7)	1	14.29	3	55.6	6	77.8	2.357	<0.05
C(n.=5)	2	40	4	62.5	85	100.0	3.309	<0.05

The results of elctroneurography in the first session were compared among the three groups for threshold, maximal amplitude and latency .

At first session, group A had least mean of threshold (17.69).Mean in group B was 22.44 and mean in group c was 24.13.

Threshold was found to be significant in comparing groups A and B and highly significant in comparing groups A and C (Table 20)

Table (20) Threshold at first session

Threshold / Study group	$\overline{X}$	±SD	Test of significance		
			Group	T	P
A	17.69	± 1.97	A×B	-3.643	<0.05
B	22.44	± 4.067	B×C	-0.9049	>0.05
C	24.13	±3.48	A×C	-5.438	<0.01

Table(21): Shows the mean(SD) and T and p values for the maximal amplitude in the three study groups at the first session.

Maximal amplitude was found to be highly significant on comparing groups A and B, and also highly significant on comparing groups A and C

Table (21) Maximum amplitude at first session.

Maximum amplitude / **Studied group**	$\bar{X}$	±SD	Test of significance		
			Group	T	P
A	629.08	± 224.35	A×B	3.97	<0.01
B	288.67	± 149.72	B×C	1.19	>0.05
C	260.25	± 84.47	A×C	3.22	<0.01

Latency did not show significant shift on increasing the intensity of stimulation.

The effect of elevating intensity on the amplitude (Figures 16, 17 and 18) was analyzed in the three groups along the sessions. In group A (Table 22 and figure 21), increasing intensity resulted in a highly significant increase in amplitude. This significance (F ratio) was increasing along the sessions, i.e. with improving of clinical stat.

In group B (Table 23 and Figure 22), the increase in amplitude started to be significant from the fourth session and the F ratio was also increasing along sessions.

Table (22) Effect of increasing intensity on amplitude in group A

Intesity / Amplitude		Threshold	Threshold + 2mA	Threshold + 4mA	Test of significance	
					F	P
1st Session	$\bar{X}$	241.85	434.23	629.08	20.71	<0.01
	SD	± 91.31	± 119.04	±224.35		
2nd Session	$\bar{X}$	246.77	441.23	677.69	30.081	<0.01
	SD	± 88.65	±125.79	±191.56		
3rd Session	$\bar{X}$	272.23	468.69	678.23	34.99	<0.01
	SD	± 79.54	± 105.97	±168.50		
4th Session	$\bar{X}$	307.54	507.077	712.23	45.40	<0.01
	SD	±74.29	± 88.28	±168.5		
5th Session	$\bar{X}$	329.62	518.85	743.77	46.67	<0.01
	SD	±126.79	±115.48	± 182.87		
6th Session	$\bar{X}$	357.23	571.92	786.73	46.76	<0.01
	SD	±113.45	±132.75	± 282.53		

Table (23) Effect of intensity increasing on amplitude in group (B)

Intensity / Amplitude		Threshold	Threshold + 2mA	Threshold + 4mA	Test of significance	
					F	P
1st Session	$\bar{X}$	161.11	258.89	288.67	2.358	>0.05
	SD	±106.02	± 131.69			
2nd Session	$\bar{X}$	162.00	253.11	292.44	2.558	>0.05
	SD	± 106.64	±124.84	±142.51		
3rd Session	$\bar{X}$	162.22	253.11	293.22	2.572	>0.05
	SD	±106.57	±125.46	± 142.10		
4th Session	$\bar{X}$	143.56	245.11	290.00	4.067	<0.05
	SD	±72.21	±116.16	±135.58		
5th Session	$\bar{X}$	143.56	246.33	285.56	4.098	<0.05
	SD	±70.81	±115.23	±131.95		
6th Session	$\bar{X}$	171.67	264.78	300.67	4.903	<0.05
	SD	±103.50	±120.08	±126.87		

In group C (table 24 and figure 23) F ratio was very small during sessions from 1 to 5 as the amplitude was not increasing properly with intensity increase e.g. in 5th session mean of amplitude at threshold was 210.75, at threshold 4.2mA it was 223.11 and at thereshol+4mA it was 223.52. P value was <0.05 (i.e. significant) only in the last session.

Table (24) Effect of intensity increasing on amplitude in group C.

Intensity / Amplitude		Threshold	Threshold + 2mA	Threshold + 4mA	Test of significance	
					F	P
1st Session	$\bar{X}$	126.38	223.50	260.25	2.638	>0.05
	SD	± 64.46	± 95.23	± 84.47		
2nd Session	$\bar{X}$	211.25	241.25	259	2.145	> 0.05
	SD	±62.08	±100.74	± 87.17		
3rd Session	$\bar{X}$	212.38	213.88	222.5	0.718	>0.05
	SD	±62.66	±89.67	±127.45		
4th Session	$\bar{X}$	250.88	259.13	262.25.	2.359	>0.05
	SD	±652	±88.66	±92.06		
5th Session	$\bar{X}$	210.75	223.11	223.52	0.532	>0.05
	SD	±65.15	± 118.23	±157.32		
6th Session	$\bar{X}$	284.00	310.93	378	3.861	<0.05
	SD	± 73.80	± 105.14	± 107.20		

When applying the same way on latency, no significant change was found with increasing intensity along the six sessions and in the three groups. Table (25) shows example of these results in group (A).

Table (25) Effect of intensity increasing on latency in group A

Intensity / Latency		Threshold	Threshold + 2mA	Threshold + 4mA	Test of significance F	Test of significance P
1st Session	$\bar{X}$ SD	5.47 ±1.14	5.60 ± 1.23	5.62 ± 1.24	0.064	>0.05
2nd Session	$\bar{X}$ SD	6.03 ± 0.93	5.95 ± 0.8511	5.62 ± 1.24	0.039	>0.05
3rd Session	$\bar{X}$ SD	6.4 ±0.078	6.41 ± 0.79	6.05 ±0.92	0.017	>0.05
4th Session	$\bar{X}$ SD	6.36 ±0.807	6.41 ±0.85	6.45 ±0.85	0.014	>0.05
5th Session	$\bar{X}$ SD	6.40 ±0.864	6.38 ±0.88	6.39 ±0.87	0.004	>0.05
6th Session	$\bar{X}$ SD	6.32 ±0.86	6.36 ±0.91	6.12 ±0.93	0.265	>0.05

When trying to use electroneurography as a measure for potential recovery, intensity and maximal amplitude were compared along the six sessions. On studying intensity (table 26 and Figure 24), thresholds were changing i.e. decreasing along the sessions by a definite ratio. This ratio was highly significant in group A, significant in group B and insignificant in group C. mean threshold was 17.69 in group A at first session and decreased to 14.47 on last session. In group C it was 24.125 at first session and declined to 21.88 on last session

(Table 26) Threshold change along sessions.

Studied group / Threshold		A	B	C
1st Session	$\bar{X}$	17.69	21.11	24.125
	SD	± 1.97	± 2.67	± 3.48
2nd Session	$\bar{X}$	17.23	20.44	24.50
	SD	± 1.88	± 2.51	±3.59
3rd Session	$\bar{X}$	16.23	19.66	23.13
	SD	±1.74	±2.35	± 4.05
4th Session	$\bar{X}$	15.92	18	22.75
	SD	±1.66	± 3.57	±4.27
5th Session	$\bar{X}$	15.08	17	22.25
	SD	± 1.98	± 3.39	±4.62
6th Session	$\bar{X}$	14.47	16.44	21.88
	SD	± 2.03	± 3.17	± 4.39
Test of significance	F	5.586	3.702	0.513
	P	<0.01	<0.05	>0.05

When applying the same way on maximal amplitude, change was increasing regularly in group (A) from first to last session. However this change did not reach significant level. In the other groups (B and C) there was no noticeable increase in amplitude over sessions and it was statistically insignificant (Table 27 and figure 25).

Table (27) Maximal amplitude change along sessions

Studied / Maximum amplitude		A	B	C
1st Session	$\bar{X}$	629.08	288.67	260.25
	SD	± 224.35	± 149.72	±84.47
2nd Session	$\bar{X}$	677.69	292.44	259
	SD	±191.56	±142.51	±87.17
3rd Session	$\bar{X}$	678.23	293.22	222.5
	SD	±168.50	±142.10	±127.45
4th Session	$\bar{X}$	712.23	290.00	262.25
	SD	± 168.5	± 135.58	± 92.06
5th Session	$\bar{X}$	743.77	285.56	223.52
	SD	±182.87	±131.95	±157.32
6th Session	$\bar{X}$	786.73	300.67	378
	SD	±282.53	±126.87	±107.20
Test of significance	F	0.963	0.013	0.326
	P	>0.05	>0.05	>0.05

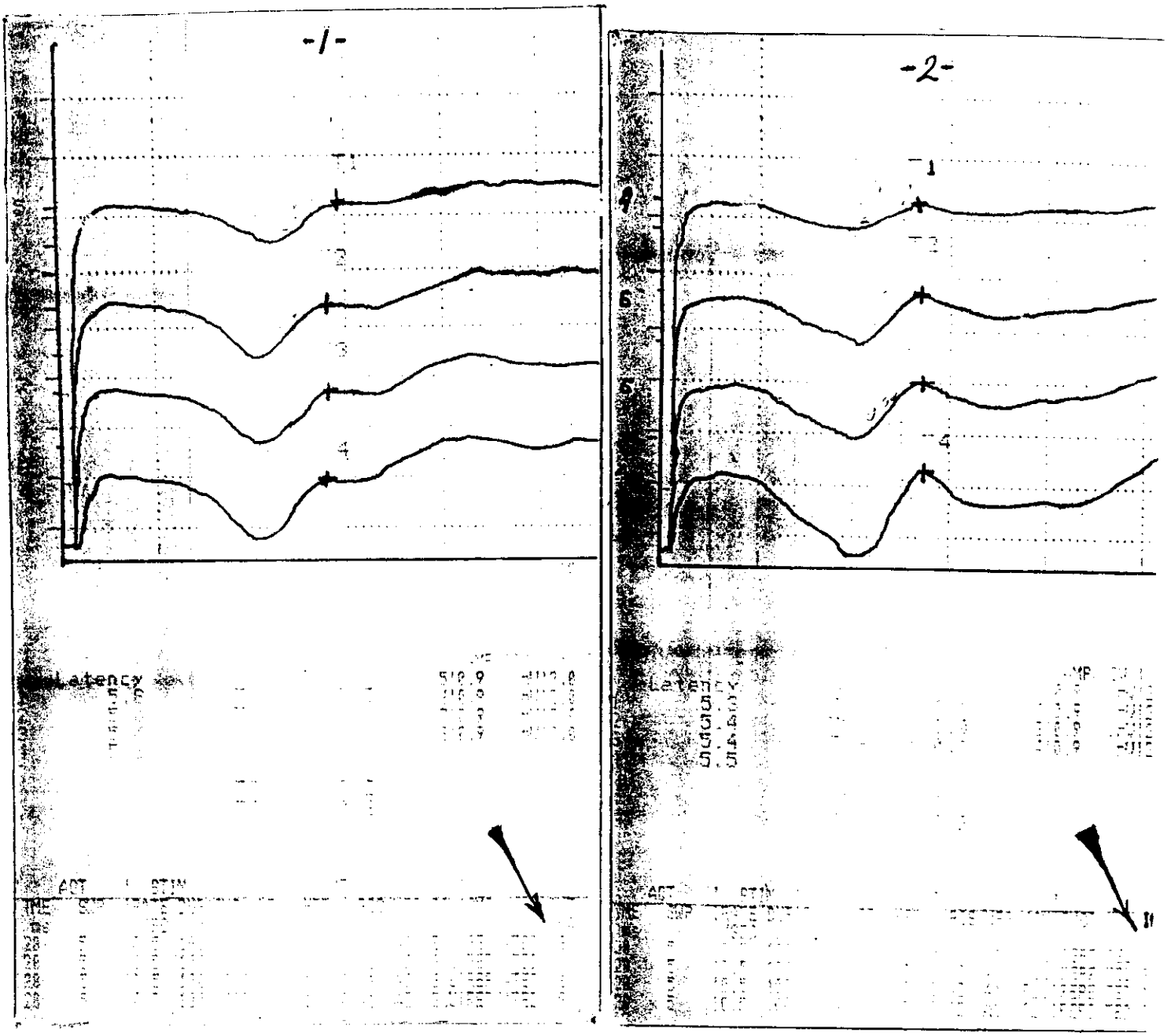


Fig (16) Traces of ENOG in case 8 it is an example for group A. trace 1 refers to the ENOG at first session. Trace 2 refers to the 6th session. The arrows refer to intensity (threshold was 12mA on first session and 7mA on last session.)

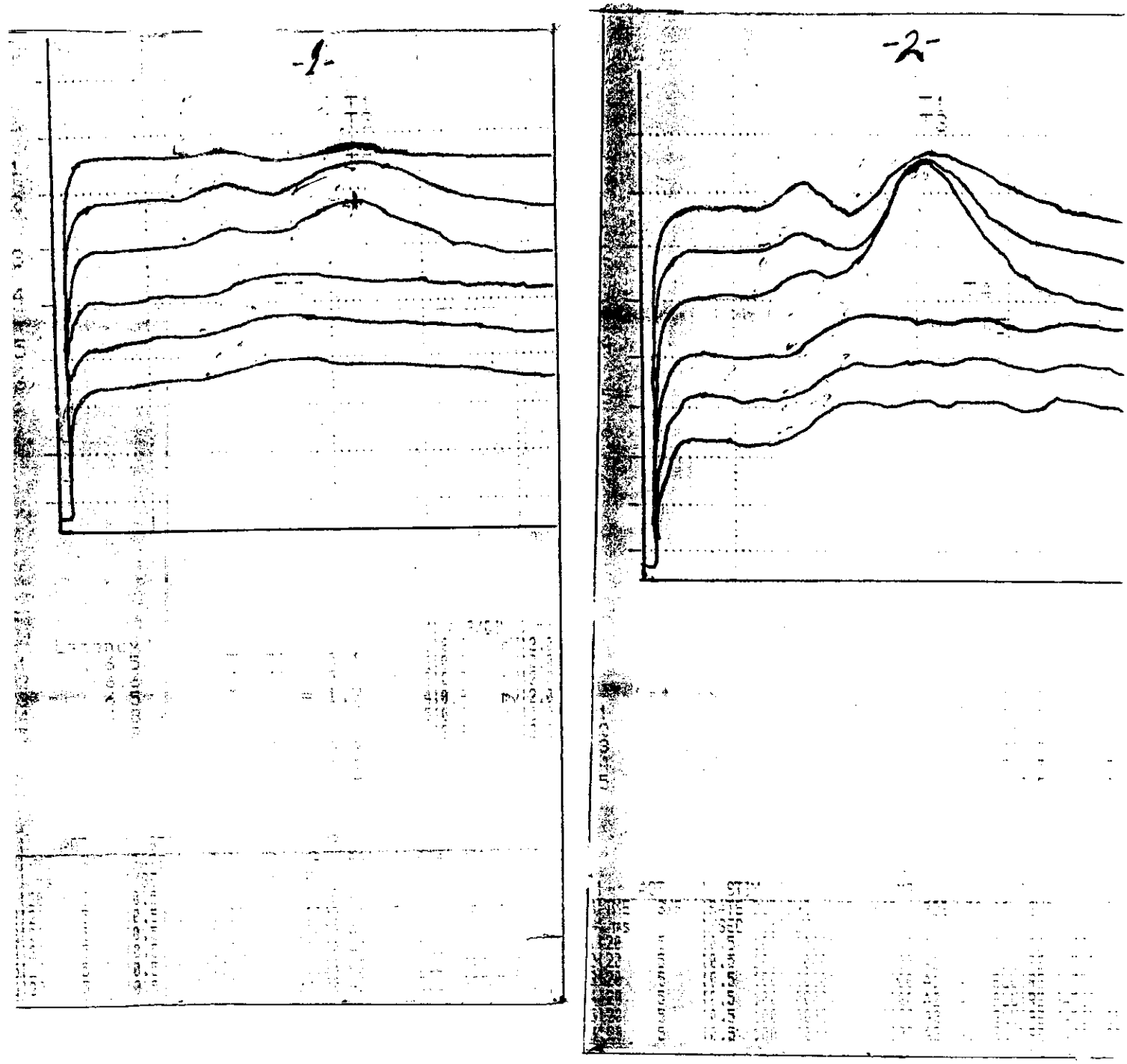


Fig (17) ENOG in case 21 as an example for group B. Trace 1 is the first session and trace 2 is the 6th session. The first 3 curves (M1, M2 and M3) refer to the normal side. Maximal amplitude at first session was 351 and it was 370 at last session.

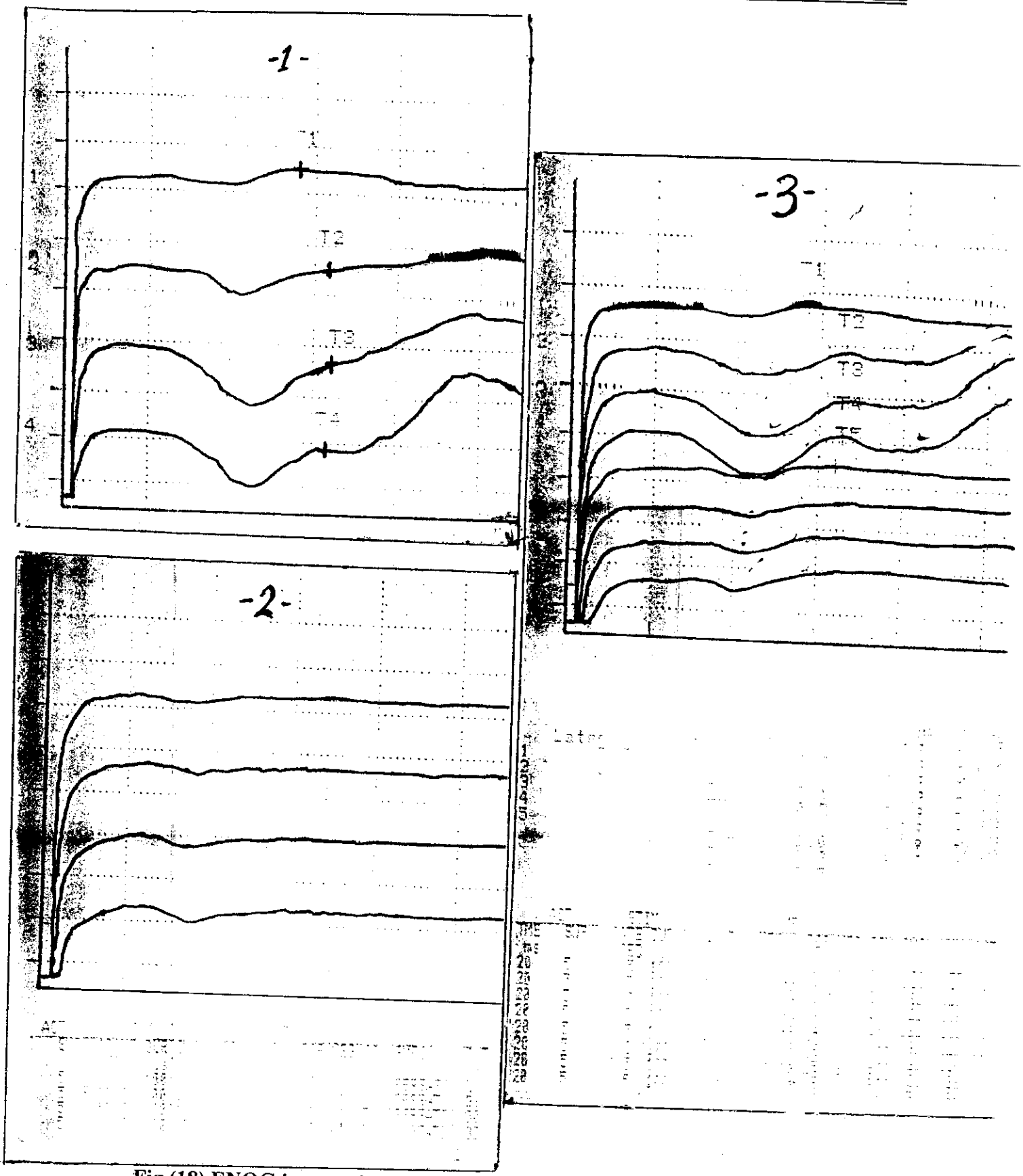


Fig (18) ENOG in cases 24 as an example for group C Manifestations started after parotidectomy. Trace 1 is the normal side. Trace 2 is the affected side at first session. Trace 3 shows normal and affected sides at last session. Notice the double peak in normal side and nearly unchanged curve in the affected side

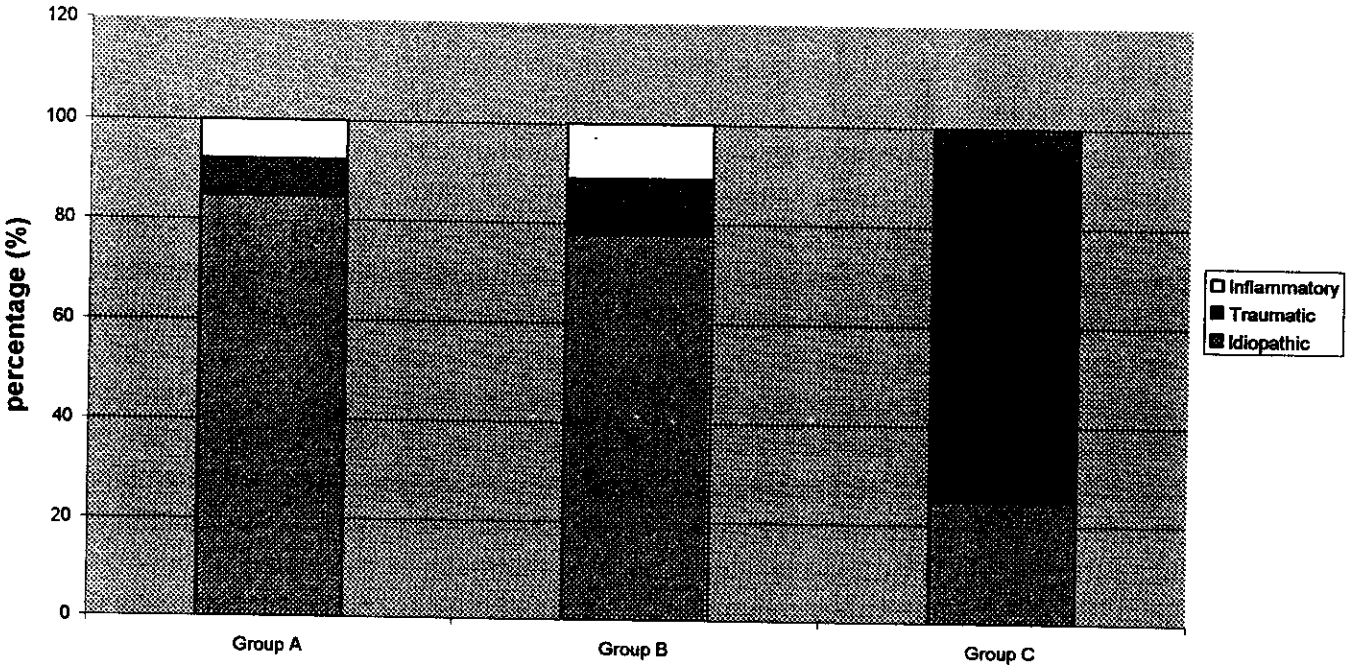


Fig (19) Etiology of facial nerve injury among the studied groups

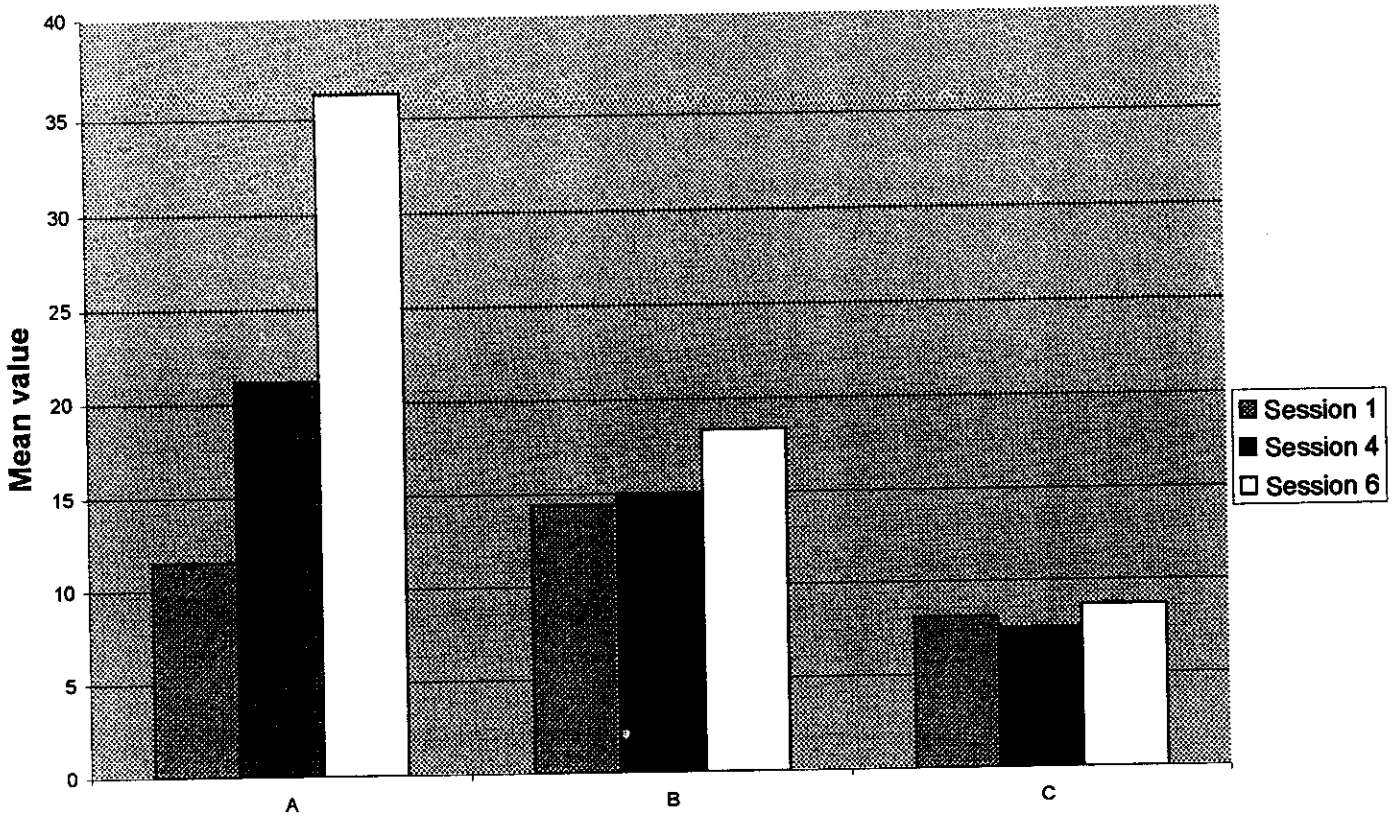


Fig (20)Motor score improvement

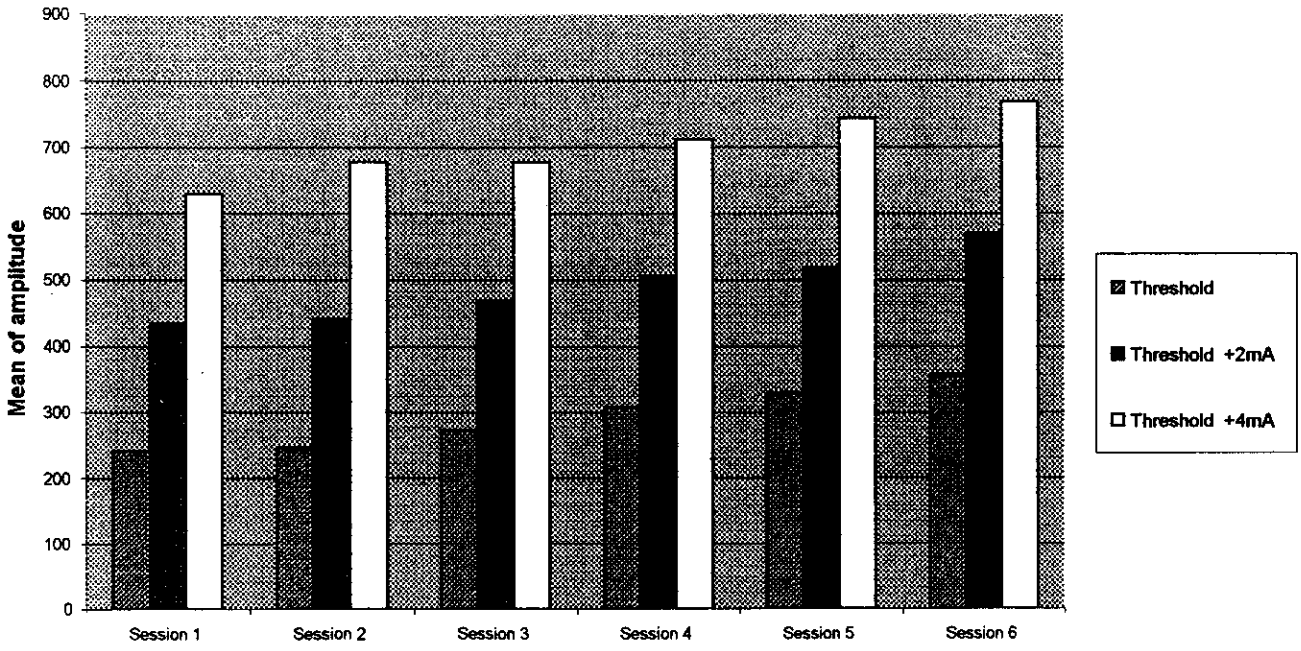


Fig (21) intensity amplitude change along sessions in group A

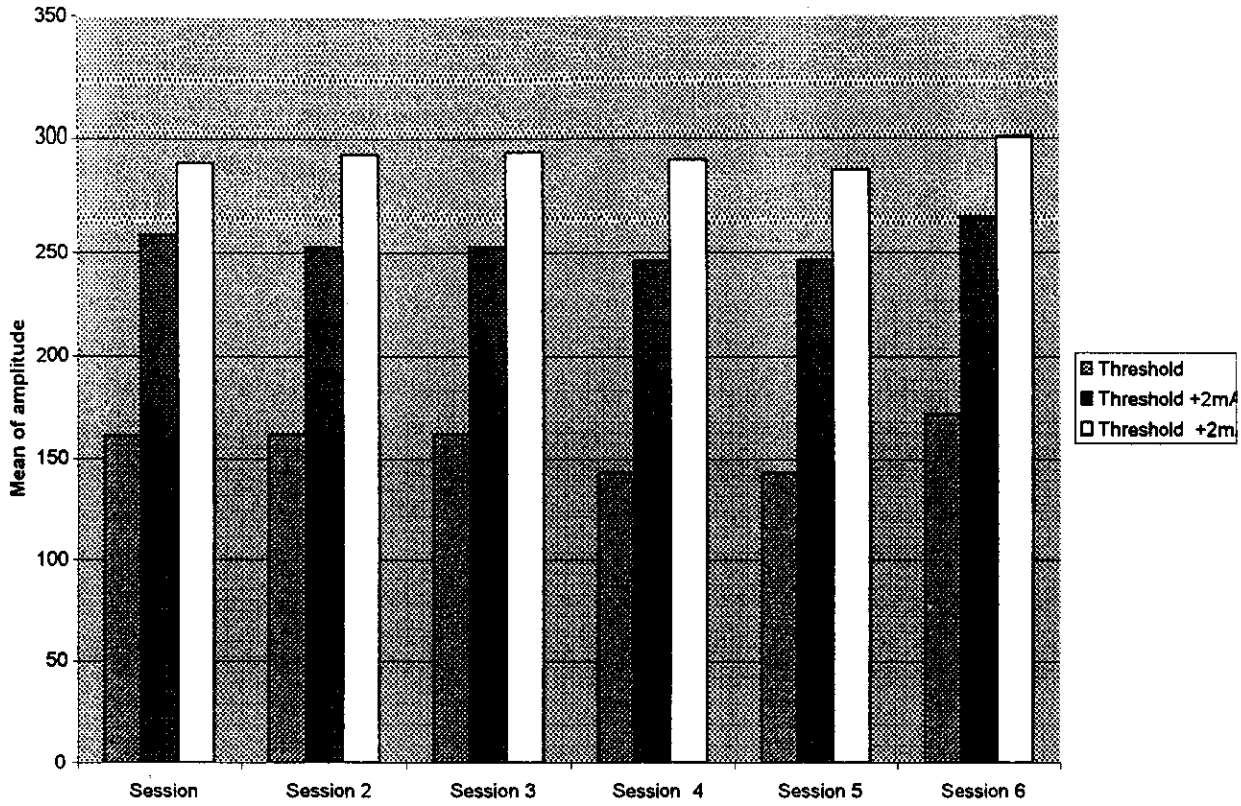
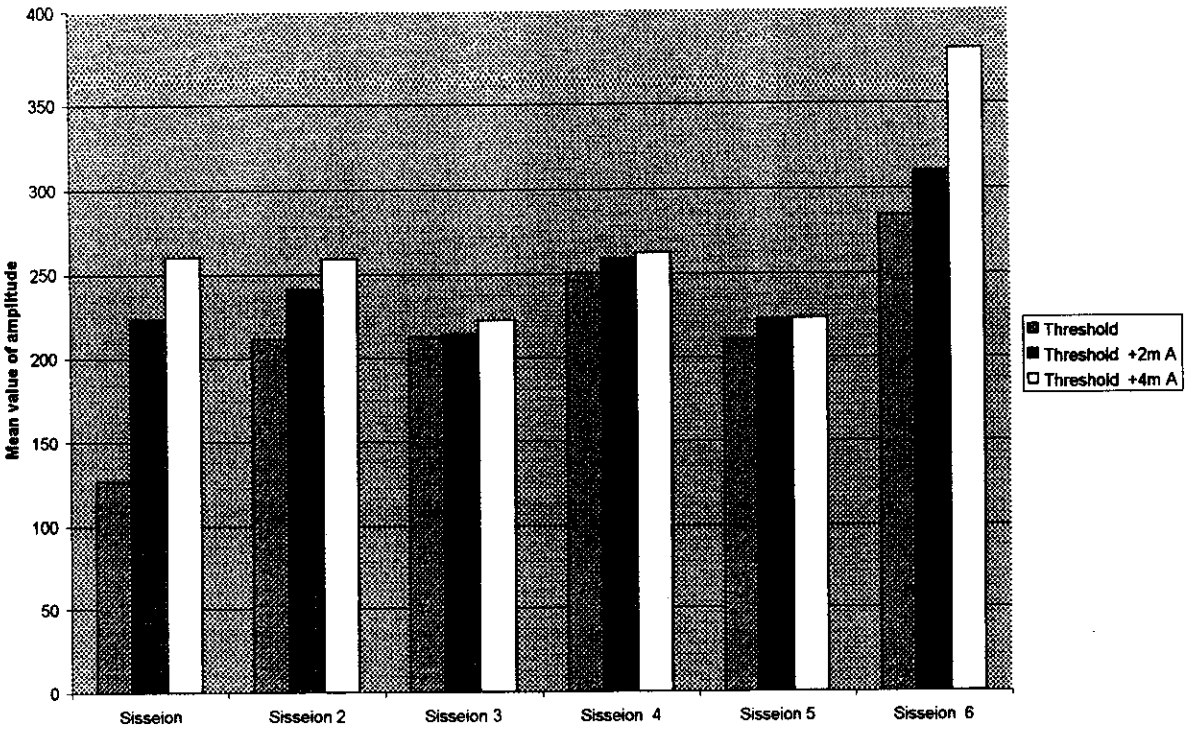


Fig (22) intensity amplitude change along sessions in group B



Fig(23): intensity amplitude change along sessions in group C

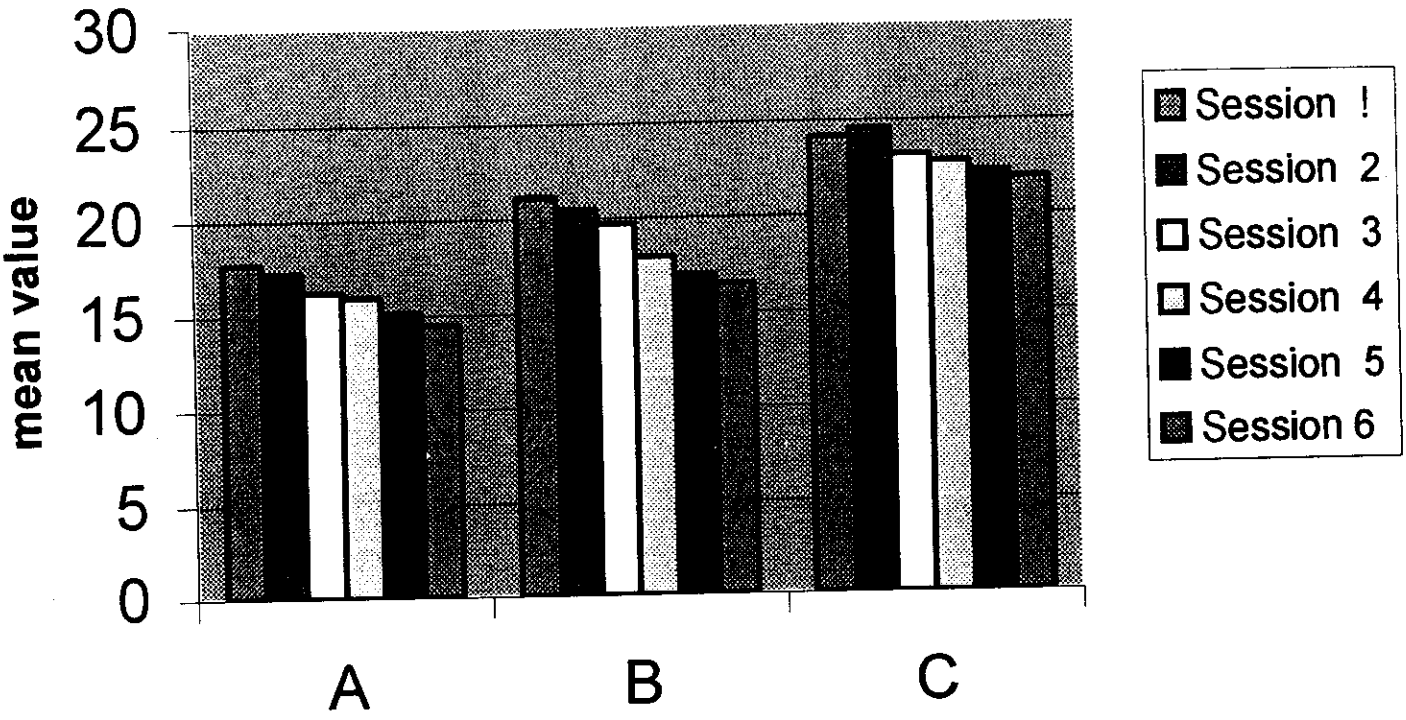
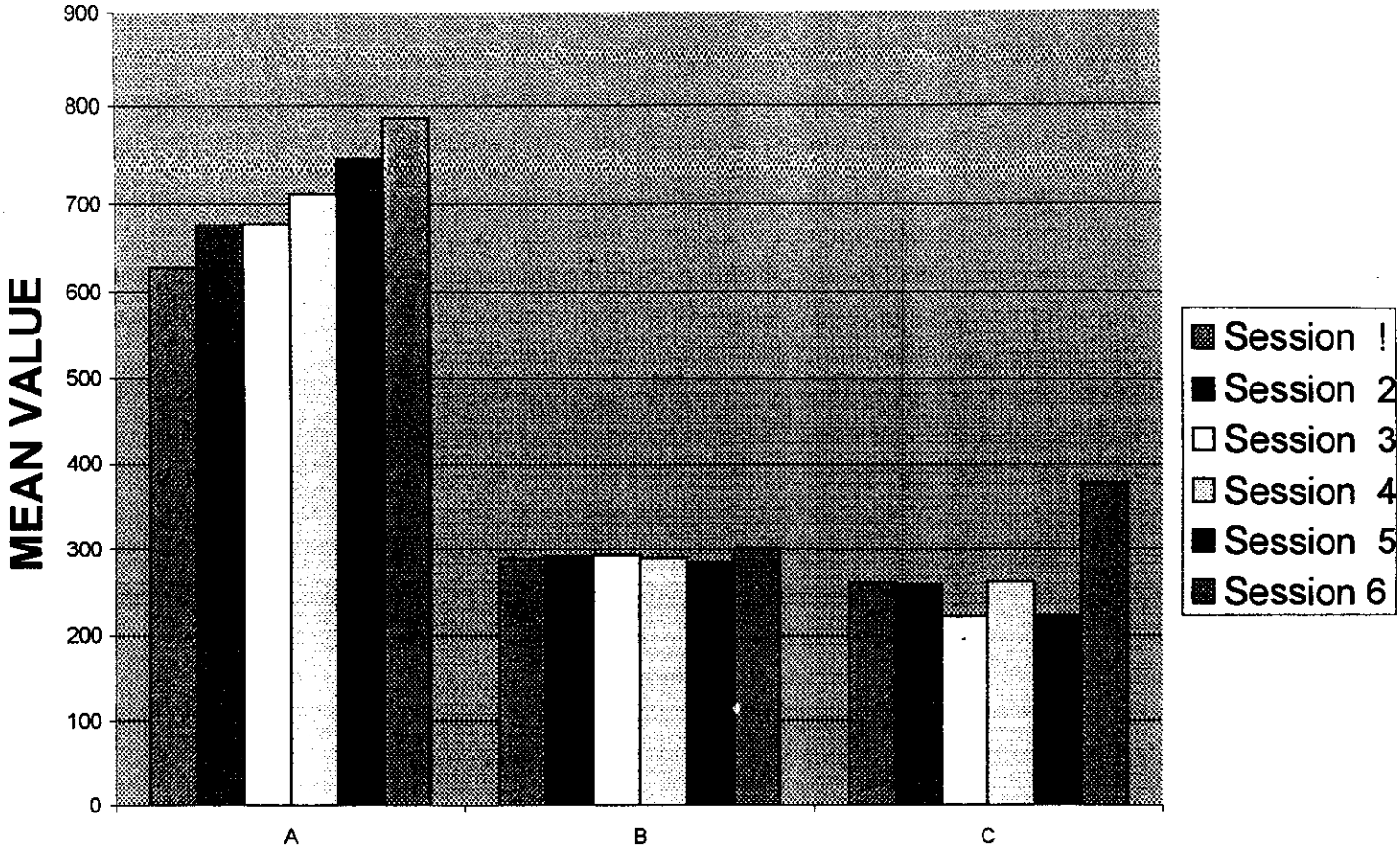


Fig (24) Threshold change along sessions



Fig(25) Maximal amplitude along sessions