RESULTS

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Eighty patients attending the outpatient clinic of Rheumatology and Rehabilitation department of Faculty of Medicine Zagazig University were examined and enrolled in our study. These 80 patients were classified into two groups according to their diagnosis; group "A" comprising 50 patients (62.5 %) complaining of frozen shoulder; and group "B" comprising 30 patients (37.5 %) complaining of Tennis Elbow. Each group of patients was subdivided into two subgroups according to the line of treatment adopted. All the patients received their treatment in the form of 3 sessions weekly for 6 weeks.

Group A : Included 50 patients, 20 males (40 %) and 30 females (60 %) whose ages ranged between 32 and 63 years, with a mean age 53 ± 4 years, duration of illness ranged between 4 and 13 months. These patients were diagnosed as having frozen shoulder, and were subdivided into two subgroups according to the line of treatment adopted.

Subgroup I : Included 25 patients (50 %), 11 males (44 %) and 14 females (56 %), whose ages ranged between 32 and 59 years with a mean of 52.2 ± 5.1 duration of illness ranged between 6 and 13 months with a mean of 6.8 ± 1.6. They were treated

with Electro-Acupuncture together with active range of shoulder movement exercises (overhead exercises, active pendular movements and shoulder wheel).

Subgroup II : Included 25 patients (50%), 9 males (36%) and 16 females (64%), whose ages ranged between 35 and 63 years, with a mean of 55.4 ± 6.2, duration of their illness ranged between 4 and 12 months with a mean of 7.2 ± 2.1. They were treated with ultra-sonic therapy together with active shoulder range of movement exercises, (overhead exercises, active pendular movements and shoulder wheel).

Group "B": Included 30 patients complaining of Tennis Elbow, they were 21 males (70%) and 9 females (30%), whose ages ranged between 33 and 62 years, with a mean age 40.2 years, the duration of their illness ranged between 3 and 13 months. These patients were further subdivided into two subgroups according to the line of treatment adopted

Subgroup III: Included 15 patients (50%) complaining of Tennis Elbow, they were 11 males (73.3%) and 4 females (26.7%), whose ages ranged between 35 and 60 years with a mean of 38.4 ± 5.1 and the duration of their illness ranged between 4 and 13 months with a mean of 5.6 ± 1.1. They were treated with Electro-Acupuncture.

Subgroup IV : Included 15 patients (50%) complaining of Tennis Elbow, they were 10 males (66.7%) and 5 females (33.3%), whose age ranged between 33 and 62 years, with a mean of 42.2 ± 6.7, the duration of their illness ranged between 3 and 12 months with a mean of 6.3 ± 1.3 and they were treated with Ultra-sonic waves.

Table (1) and Histogram 1; Show comparison between sex distribution in the treatment groups, the percentage of males (40%) was lower than the percentage of females (60%) in patients of (group "A") while the percentage of males (70%) was higher than the percentage of females (30%) in patients of (group "B")

Table (2) and Histogram 2; Show comparison between age and duration of illness among groups studied, that there is no significant differences between them as regard the age of patients and the duration of the disease ($P < 0.05$)

The results of each group of patients were presented separately, values of different indices were measured before and after treatment and compared for each patient.

Subgroup 1

Pain (Tables 3,4) and Histogram 3:

Before treatment; Shoulder pain was complained of by all the patients (100%). It was severe in 17 cases (68%) and moderate in 8 cases (32%), with a mean severity score of 2.68 ± 0.48.

After treatment; Shoulder pain was complained of by 22 cases (88%). It was severe in 2 (8%), moderate in 16 (64%) and mild in 4 cases (16%), with a mean severity score of 1.68 ± 0.8. A significant decrease in the pain score was obtained after treatment ($P < 0.001$).

Tenderness (Tables 3 & 4) and Histogram 3 :

Before treatment; Thirteen cases (52%) showed severe

tenderness, and 12 cases (48%), showed moderate tenderness, with a mean score of 2.52 ± 0.51.

After treatment; Two cases (8%) showed severe tenderness, 13 cases (52%) showed moderate tenderness, 8 cases (32%) showed mild tenderness and 2 cases (8%) had no tenderness, with a mean score of 1.6 ± 0.76. A significant improvement in the score of tenderness was obtained after treatment ($P < 0.001$).

Subjective Shoulder Stiffness (Tables 3 & 4) and Histogram 3 :

Before treatment; Shoulder stiffness was complained of by all the patients (100%). It was severe in 19 cases (76%) and moderate in 6 cases (24%), with a mean score of 2.76 ± 0.44.

After treatment; Shoulder stiffness was complained of by all (100%) patients. It was severe in 3 cases (12%), moderate in 19 (76%) and mild in 3 cases (12%), with mean score of 2 ± 0.5. A significant decrease in subjective shoulder stiffness was observed after treatment ($P < 0.001$).

Subjective Assessment of Functional Disability (Tables 3 & 4) and Histogram 3 :

The mean grade was 2.6 ± 0.58 before treatment and 1.84 ± 0.75 after treatment. A significant decrease in functional disability was obtained after treatment ($P < 0.001$).

Passive Range of Shoulder Movements (Tables 5 & 6) and Histogram 4 :

The mean degree of passive shoulder flexion was 57° ± 10.41 before treatment and 64° ± 10.9 after treatment. A significant increase was obtained ($P < 0.001$).

The mean degree of passive shoulder extension was 27.2° ± 7.37 before treatment and 31.4° ± 6.7 after treatment. A significant increase was obtained ($P < 0.001$).

The mean degree of passive shoulder adduction was 27.2° ± 7.78 before treatment and 33.4° ± 8 after treatment with a significant increase after treatment ($P < 0.001$).

The mean degree of passive shoulder abduction was 48.2° ± 8.88 before treatment and 57.2° ± 7.78 after

treatment, with a significant increase after treatment ($P < 0.001$).

The mean degree of passive shoulder internal rotation was $33.4^{\circ} \pm 7.32$ before treatment and $40.4^{\circ} \pm 6.76$ after treatment. A significant increase was observed ($P < 0.001$).

The mean degree of passive shoulder external rotation was $26.4^{\circ} \pm 7.15$ before treatment and $35.2^{\circ} \pm 9.73$ after treatment. A significant increase was obtained after treatment ($P < 0.001$).

Subgroup II:

Pain (Tables 7 & 8) and Histogram 5 :

Before treatment; Shoulder pain was complained of by all the patients (100%). It was severe in 18 cases (72%) and moderate in 7 (28%), with a mean severity score of 2.7 ± 0.46.

After treatment; Shoulder pain was complained of by all the patients (100%). It was severe in 8 cases (32%) moderate in 11 cases (44%) and mild in 6 cases (24%) with

mean severity score of 2.08 ± 0.76. A significant decrease in pain score was obtained after treatment (P < 0.001).

Tenderness (Tables 7 & 8) and Histogram 5 :

Before treatment; Fourteen cases (56%) showed severe tenderness, 11 cases (44%) showed moderate tenderness, with a mean score of 2.56 ± 0.51.

After treatment; Five cases (20%) showed severe tenderness, 13 cases (52%) showed moderate tenderness, 4 cases (16%) had mild tenderness and 3 (12%) cases showed no tenderness, with a mean score of 1.8 ± 0.91. A significant improvement was observed after treatment (P < 0.001).

Subjective Shoulder Stiffness (Tables 7 & 8) and Histogram 5 :

Before treatment; Shoulder stiffness was complained of by all the patients (100%). It was severe in 17 cases (68%) and moderate in 8 cases (32%) with a mean score of 2.68 ± 0.48.

After treatment; Shoulder stiffness was complained of by 23 patients (92%) it was severe in 2 cases (8%), moderate in 15 (60%) and mild in 6 cases (24%) with a mean

score of 1.68 ± 0.75. There was a significant improvement of subjective shoulder stiffness after treatment (P < 0.001).

Subjective Assessment of Functional Disability (Tables 7 & 8) and Histogram 5:

The mean grade was 2.76 ± 0.66 before treatment and 1.8 ± 0.58 after treatment, with a significant decrease after treatment (P < 0.001).

Passive Range of Shoulder Movements (Tables 9 & 10) and Histogram 6 :

The mean degree of passive shoulder flexion was 55.4°± 11.81 before treatment and 69°± 7.77 after treatment, where a significant increase was observed (P < 0.001).

The mean degree of passive shoulder extension was 29°± 6.46 before treatment and 35.8°± 5.14 after treatment, with significant increase was observed (P < 0.001).

The mean degree of passive shoulder adduction was 25.8°± 7.02 before treatment and 35.2°± 6.69 after treatment. This increase was significant (P < 0.001).

The mean degree of passive shoulder abduction was

41.6°± 8.38 before treatment and 57°± 8.9 after treatment where significant increase was observed (P < 0.001).

The mean degree of passive shoulder internal rotation was 30.8°± 8.38 before treatment and 38.6°± 8.36 after treatment with a significant increase (P , 0.001).

The mean degree of passive shoulder external rotation was 23.6° ± 8.36 before treatment and 34° ± 9.13 after treatment. A significant increase was also observed (P < 0.001).

Table (11) and Histogram 7; Show comparison between the results of subgroup (I) and subgroup (II) after treatment as regard pain, Tenderness, subjective shoulder stiffness and functional assessment, the better response was noticed in subgroup (I) but the difference was statistically insignificant (P > 0.05)

Table (12) and Histogram (8); Show comparison between the results of subgroup (I) and subgroup (II) after treatment as regard the passive range of different shoulder movements, the better

(13.3%) and mild in 9 cases (60%), with a mean score of 1.07 ± 0.8. A significant improvement was observed after treatment (P < 0.001).

Subgroup IV:

Pain (Tables 15 & 16 and Histogram 10 :

Before treatment; Pain was complained of by all the patients (100%). It was severe in 10 cases (66.7%) and moderate in 5 cases (33.3%), with a mean severity score of 2.67 ± 0.49.

After treatment; Pain was complained of by 12 patients (80%). It was severe in one case (6.7%), moderate in 2 cases (13.3%) and mild in 9 cases (60%), with a mean severity score of 1.8 ± 0.68, where a significant decrease was obtained (P < 0.001).

Tenderness (Tables 15 & 16) and Histogram 10:

Before treatment; Eight cases (53.3%) showed severe tenderness and 7 cases (46.7%) showed moderate tenderness, with a mean score of 2.53 ± 0.52.

After treatment; All the cases (100%) showed tenderness, it was moderate in 9 cases (60%) and mild in 6

cases (40%), with a mean score of 1.6 ± 0.51. A significant improvement was obtained after treatment ($P < 0.001$).

Table (17) and Histogram 11; Show comparison between the results of subgroup (III) and subgroup (IV) after treatment as regard pain and tenderness, the better response was noticed in subgroup (III) and the difference was statistically significant ($P < 0.01$).

Table (1)

Sex distribution in the treatment groups

groups	subgroups	males No.	males %	females No.	females %	total number
A n = 50	I	11	44 %	14	56 %	25
	II	9	36 %	16	64 %	25
B n = 30	III	11	73.3 %	4	26.7 %	15
	IV	10	66.7 %	5	33.3 %	15

This table shows that the percentage of males (40 %) was lower than the percentage of females (60 %) in patients of frozen shoulder (group "A") while the percentage of males (70 %) was higher than the percentage of females (30 %) in patients of tennis elbow (group "B").

Table (3)

The average score values of pain, tenderness, subjetive shoulder stiffness and functional assessment before and after treatment of subgroup (I)

	pain		tend.		subj.sho.stif.		funct.assess.	
	before	after	before	after	before	after	before	after
$\bar{x}$	2.68	1.68	2.52	1.6	2.76	2	2.6	1.84
S.D.	0.48	0.8	0.51	0.76	0.44	0.5	0.58	0.75
N	25	25	25	25	25	25	25	25

$\bar{x}$ = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is improvement in the average score values of pain, tenderness, subjective shoulder stiffness and functional assessment throughout the study.

Table (4)

The difference between the mean score of pain, tenderness, subjective shoulder stiffness and functional assessment before and after treatment in subgroup (I)

	pain	tenderness	subj.shou.stif.	func.assess
$\bar{X}$	1	0.92	0.76	0.76
S.D.	0.71	0.91	0.44	0.66
N	25	25	25	25
t	7.71	5.06	8.72	5.73
P	< 0.001	< 0.001	< 0.001	< 0.001

t = paird t.
P = propability of error
$\bar{x}$ = difference between the mean before and after treatment.

This table shows that there is significant improvement in the average score values of pain, tenderness, subjective shoulder stiffness and functional assessment throughout the study.

Table (5)

The average of passive range of shoulder movements before and after treatment of subgroup (I)

	flexion		extents.		adduction		abduction		intern.rot.		ext.rot.	
	before	after	before	after	before	after	before	after	before	after	before	after
X	57	64	27.2	31.3	27.2	33.4	48.2	57.2	33.4	40.4	26.4	35.2
S.D.	10.41	10.90	7.37	6.70	7.78	8	8.88	7.78	7.32	6.76	7.15	9.73
N	25	25	25	25	25	25	25	25	25	25	25	25

x = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is improvement of the passive range of all shoulder movements throughout the study.

Table (6)

The difference between the results of passive range of movement before and after treatment in subgroup (I)

	flexion	extent.	addu.	abdu.	int.rot.	extens.rot.
X	7	4.2	6.2	9	7	8.8
S.D.	3.82	2.77	3.62	4.79	3.23	4.63
N	25	25	25	25	25	25
t	9.17	7.58	8.57	9.4	10.84	9.51
P	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

t = paird t.
p = probability of error.
$\bar{x}$ = difference between the mean before and after treatment.

This table shows that there is significant improvement of passive range of different shoulder movements throughout the study.

Table (7)

The score of pain , tenderness, subjective shoulder stiffness and functional assessment before and after treatment in subgroup (II)

	Pain		Tenderness		Subj.Should.Stif.		Func.Assess	
	bef.	aft.	bef.	aft.	bef.	aft.	bef.	aft.
X	2.72	2.08	2.56	1.8	2.68	1.68	2.76	1.8
S.D.	0.46	0.76	0.51	0.91	0.48	0.75	0.66	0.58
No.	25	25	25	25	25	25	25	25

x = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is improvement of the average score values of pain, tenderness, subective shoulder stiffness and functional assessment throughout the study.

Table (8)

The difference between the results of subgroup (II) before and after treatment as regard pain, tenderness subjective shoulder stiffness and functional assessment

	pain	tenderness	subj.should.stif.	func.ass.
$\bar{x}$	0.64	0.76	1	0.96
S.D.	0.69	0.66	0.65	0.54
N	25	25	25	25
t	6.53	5.73	7.75	8.91
P	< 0.001	< 0.001	< 0.001	< 0.001

t = paird t.
P = propability of error
$\bar{x}$ = the difference between the means before and after treatment.

This table shows that there is significant improvement of average score value of pain, tenderness, subjective shoulder stiffness and functional assessment throughout the study.

Table (9)

The passive range of shoulder movements before and after treatment of subgroup (II)

	flexion		extents.		adduction		abduction		intern.rot.		ext.rot.	
	before	after	before	after	before	after	before	after	before	after	before	after
X	55.4	69	29	35.8	25.8	35.2	41.6	57	30.8	38.6	23.6	34
S.D.	11.81	7.77	6.46	5.14	7.02	6.69	8.38	8.9	8.38	8.36	8.36	9.13
N	25	25	25	25	25	25	25	25	25	25	25	25

x = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is improvement of the passive range of different shoulder movements throughout the study.

Table (10)

The difference between the results of passive range of movement before and after treatment in subgroup (II)

	flexion	extent.	addu.	abdu.	int.rot.	extens.rot.
$\bar{X}$	13.6	6.8	9.4	15.4	7.8	10.4
S.D.	8.48	4.30	3.33	6.44	3.56	3.51
N	25	25	25	25	25	25
t	8.02	7.9	14.12	11.95	10.95	14.8
P	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

$\bar{x}$ = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is significant improvement of passive range of different shoulder movements throughout the study.

Table (11)

Comparison between the results of subgroup I and II after treatment as ragard pain, tenderness, subjective shoulder stiffness and functional assessment.

		pain score	tenderness score	subjective shoulder	functional assessment
Elec. Acupuncture & physical Exercises.	$\bar{X}$	1.68	1.6	2	1.84
	S.D.	0.8	0.76	0.5	0.75
	N	25	25	25	25
Ultra-Sonic Therapy & physical Exercises	$\bar{X}$	2.08	1.8	1.68	1.80
	S.D.	0.73	0.91	0.75	0.58
	N	25	25	25	25
t		1.81	0.84	1.78	0.21
P		> 0.05	> 0.05	> 0.05	> 0.05

This table shows that the average score values of pain, tenderness, subjective shoulder stiffness and functional assessment was better in patient treated with electro-acupuncture and physical exercises than those treated with ultra-sonic waves and physical exercises but this difference was statistically in significant.

Table (12)

Comparison between the effect of treatment on passive range of different shoulder movement after treatment of subgroup (I) and (II)

		flexion	extents.	adduction	abduction	int.rot.	ext.rot.
Sub-group (I)	$\bar{X}$	64	31.4	33.4	5.72	40.4	35.2
	S.D.	10.9	6.7	8	7.76	6.76	9.73
	N	25	25	25	25	25	25
Sub-group (II)	$\bar{X}$	69	35.8	35.5	5.7	38.6	34
	S.D.	7.77	5.14	6.69	8.9	8.36	9.13
	N	25	25	25	25	25	25
t		1.87	2.61	0.86	0.09	0.84	0.45
p		> 0.05	> 0.05	> 0.05	> 0.01	> 0.05	> 0.05

$\bar{x}$ = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that the average values of passive range of different shoulder movements was better in patients treated with ultra-sonic waves and physical exercises than those treated with electro-acupuncture and physical exercises but this difference was statistically insignificant.

Table (13)

The score of pain and tenderness before and after treatment of Subgroup (III)

	pain score		tenderness score	
	before	after	before	after
$\bar{X}$	2.47	1.27	2.6	1.07
S.D.	0.52	0.70	0.51	0.8
N	15	15	15	15

x = mean.
s.d. = standard deviation.
n = number of cases.

This table shows that there is imporvement of the average score values of pain and tenderness throughout the study.

Table (14)

Difference between the results of subgroup III before and after treatment as regard pain and tenderness.

	$\bar{X}$	S.D	N.	t.	P.
Pain	1.2	0.56	15	8.29	< 0.001
Tenderness	1.53	0.64	15	9.28	< 0.001

x = the difference between the means before and after treatment.
t = paird t.
p = propability of error.

This table shows that there is a significant improvement of average score value of pain and tenderness throughout the study.

Table (15)

The score of pain and tenderness before and after treatment of subgroup (IV)

	pain		tenderness	
	before	after	before	after
$\bar{x}$	2.67	1.8	2.53	1.6
S.D.	0.49	0.68	0.52	0.51
N	15	15	15	15

$\bar{x}$ = mean.
s.d. = Standard deviation.
n = number of cases.

This table shows that there is imporvement of the average score values of pain and tenderness throughout the study.

Table (16)

Difference between the results of subgroup IV before and after treatment as regard pain and tenderness.

	$\bar{X}$	S.D	N.	t.	P.
Pain	0.87	0.74	15	4.52	< 0.001
Tenderness	0.93	0.70	15	5.14	< 0.001

$\bar{x}$ = the difference between the means before and after treatment.
s.d. = standard deviation.
t = paird t.
p = propability of error.

This table shows that there is a significant improvement of the average score value of pain and tenderness after treatment.

Table (17)

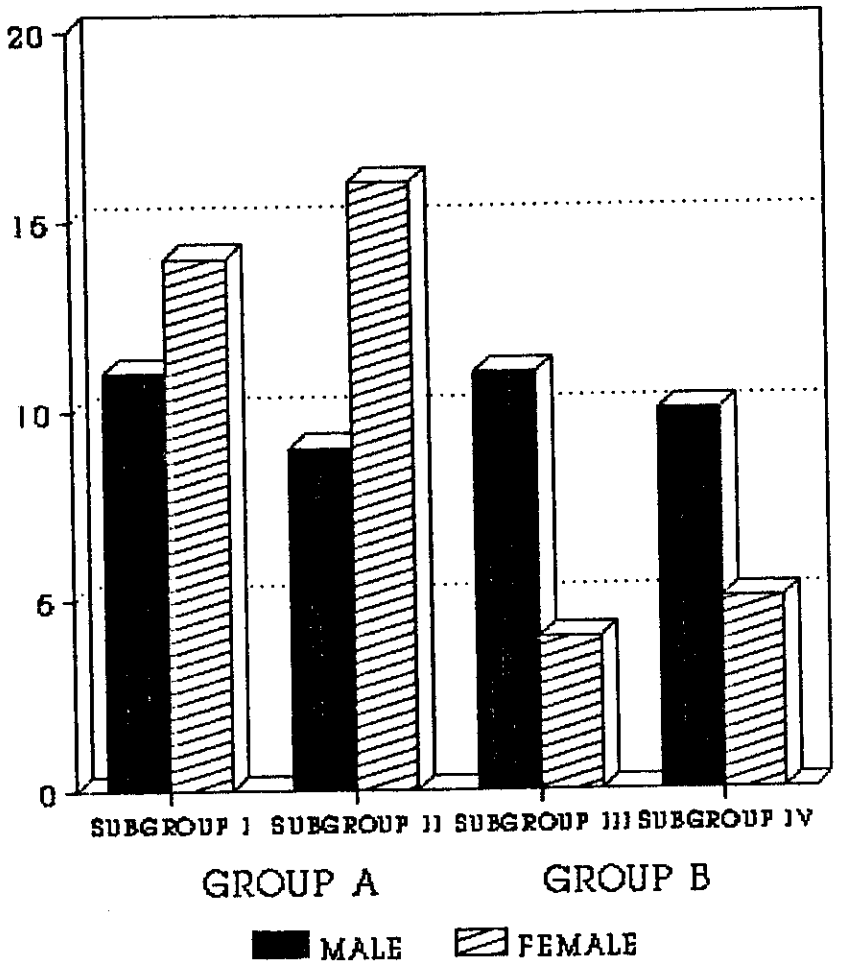
Comparison between the results of subgroup III and IV after treatment as regard pain and tenderness scores.

	Subgroup III			Subgroup IV			t	P
	$\bar{X}$	S.D.	N	$\bar{X}$	S.D.	N.		
Pain	1.27	0.7	15	1.8	0.68	15	2.12	< 0.01
Tenderness	1.07	0.8	15	1.6	0.51	15	2.18	< 0.05

$\bar{x}$ = the difference between the means before and after treatment.
s.d. = standard deviation.
n = number of cases.
t = paird t.
p = propability of error.

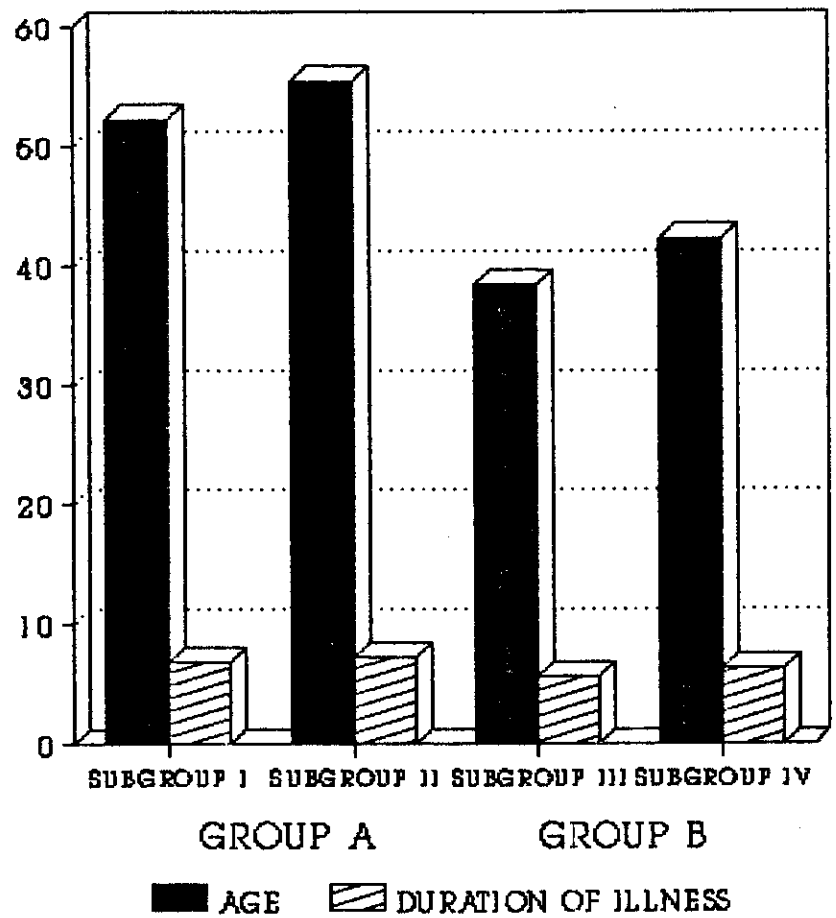
This table shows that the average score values of pain and tenderness was better in patients treated with electro-acupuncture than those treated with ultra-sonic therapy and this difference was statistically significant.

SEX DISTRIBUTION IN THE GROUP STUDIED



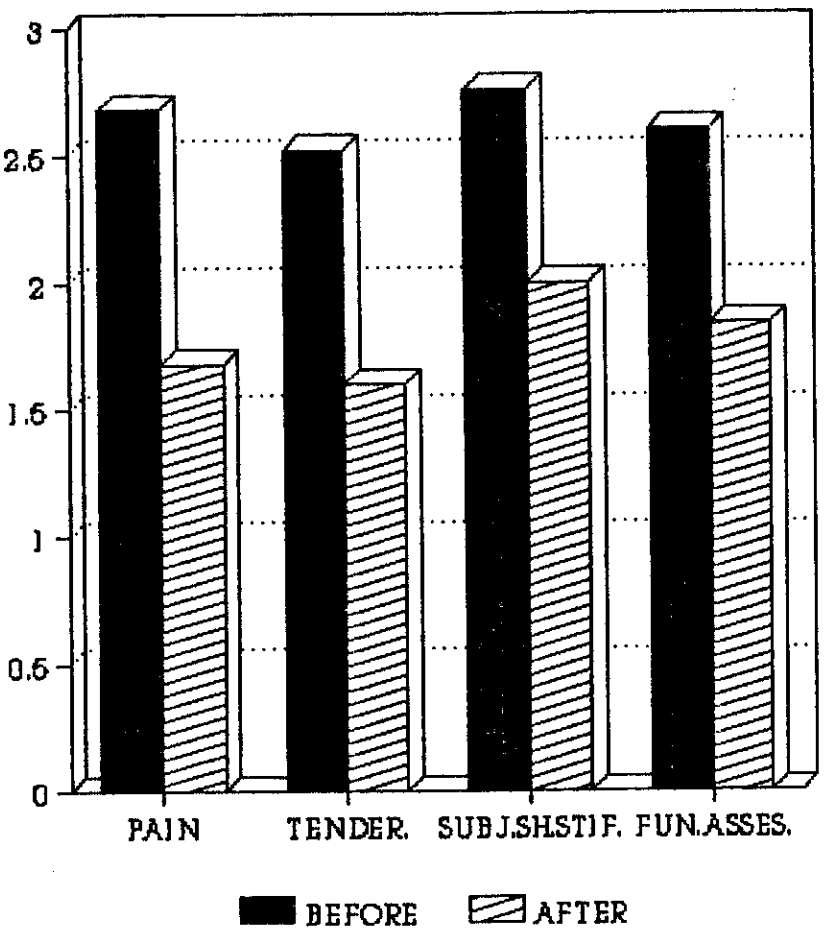
HISTOGRAM 1

AGE & DURATION OF ILLNESS IN THE GROUP STUDIED



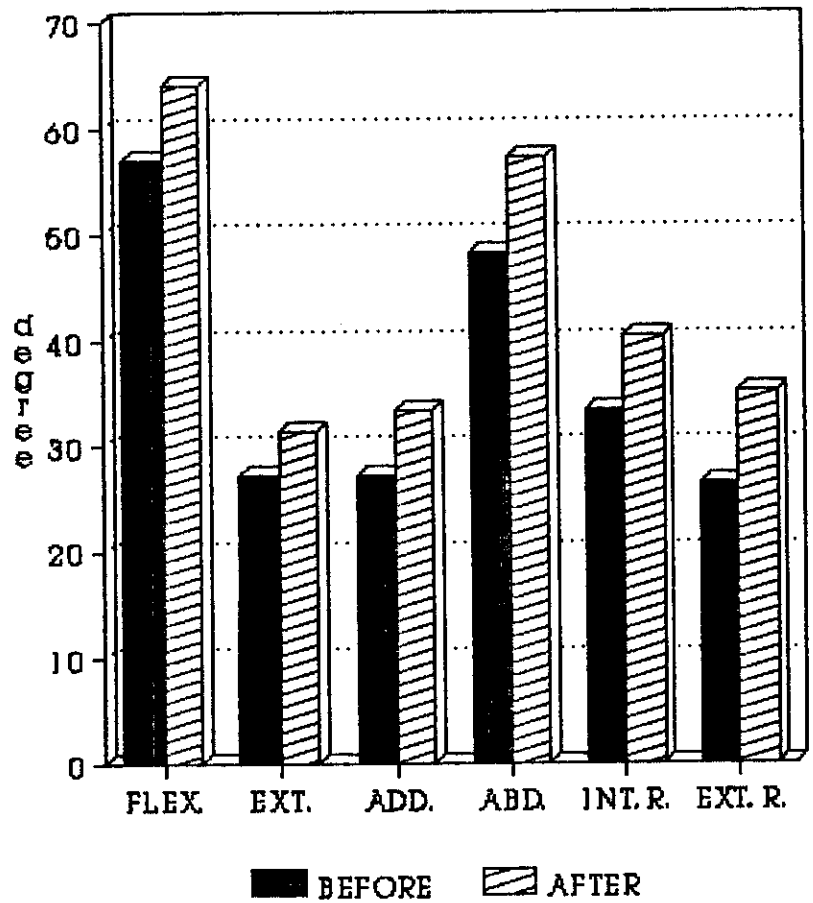
HISTOGRAM 2

THE SCORE VALUES OF CLINCAL PARAMETERS BEFORE & AFTER ttt IN SUBGROUP I



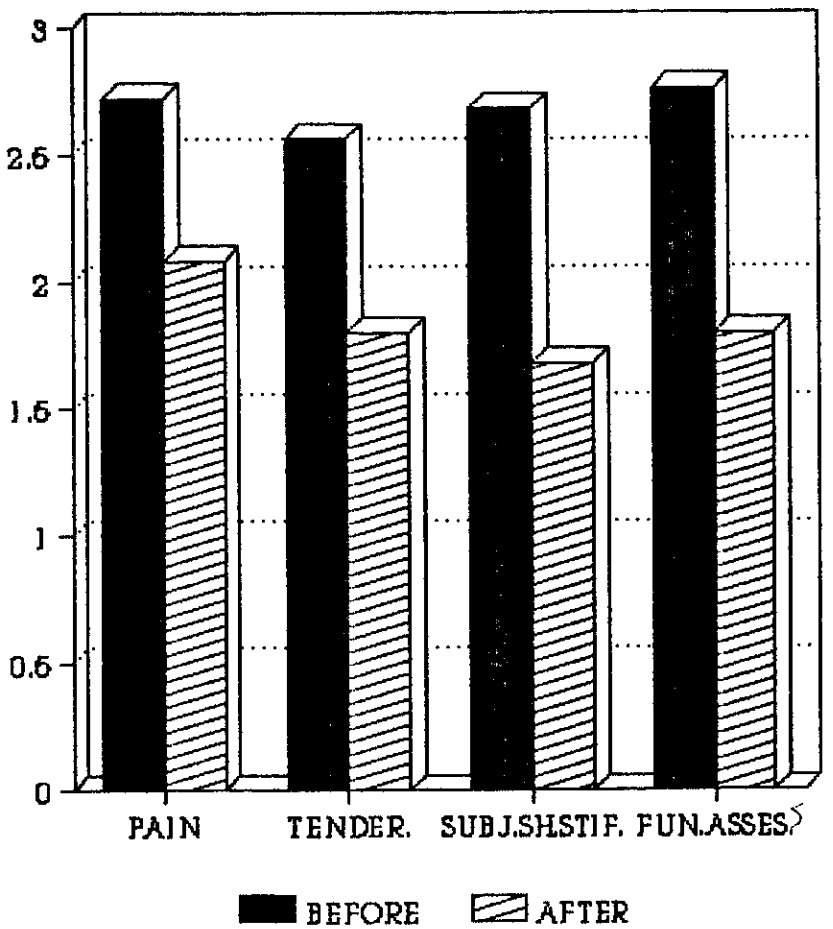
HISTOGRAM 3

THE PASSIVE SHOULDER RANGE OF MOVEMENTS BEFORE & AFTER ttt IN SUBGROUP I



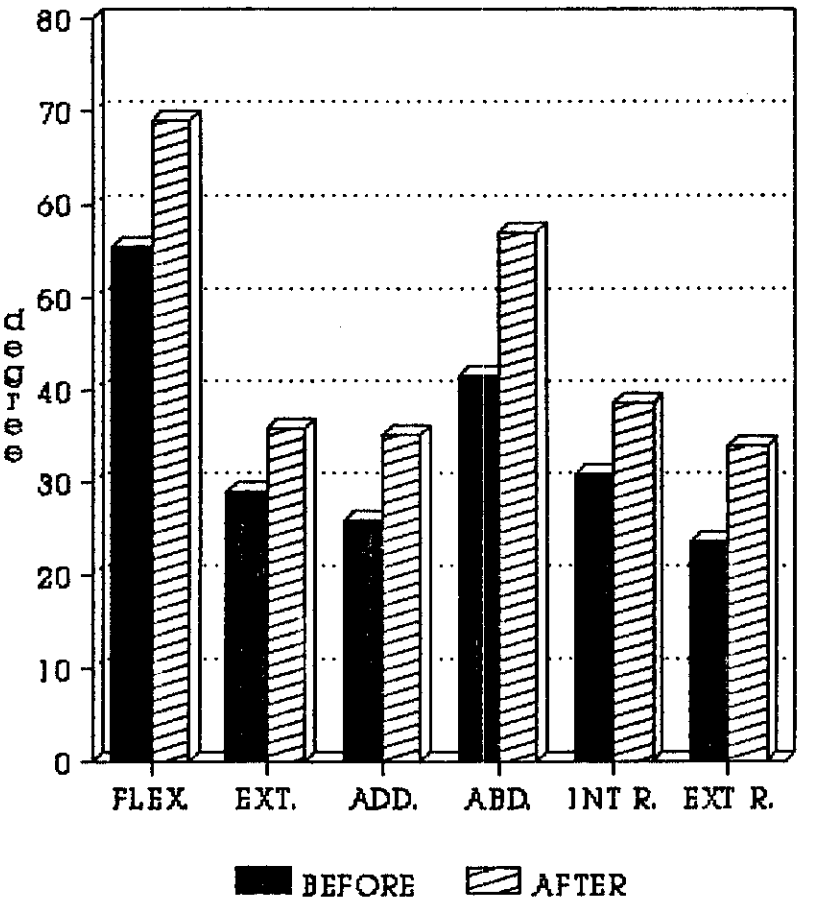
HISTOGRAM 4

THE SCORE VALUES OF CLINCAL PARAMETERS BEFORE & AFTER ttt IN SUBGROUP II



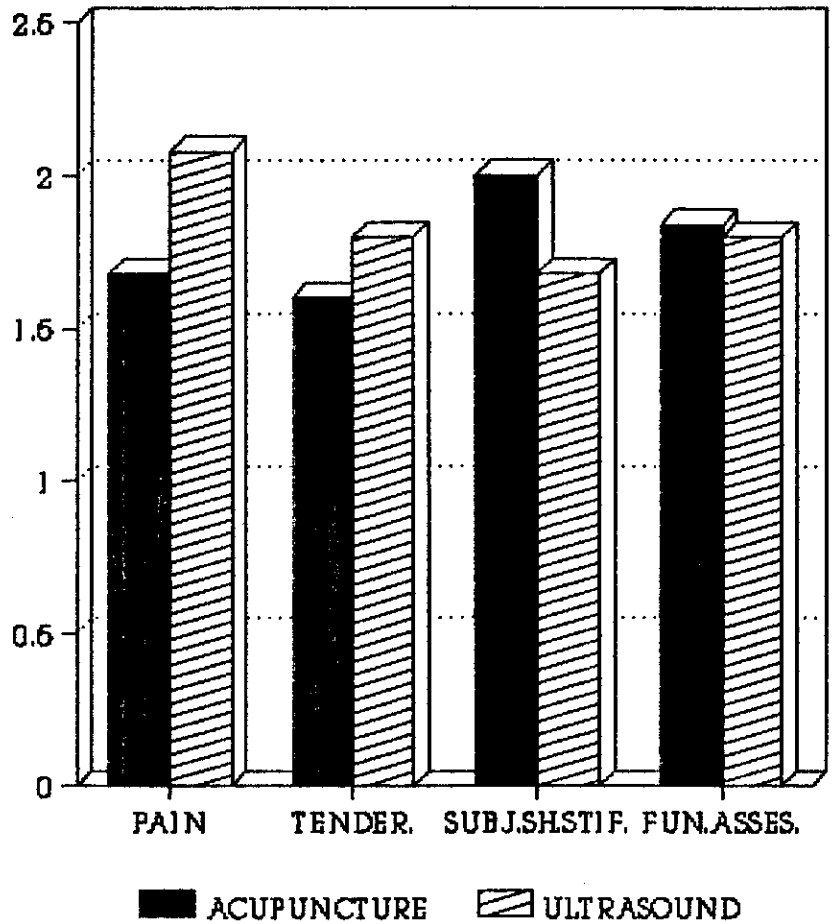
HISTOGRAM 5

THE PASSIVE SHOULDER RANGE OF MOVEMENTS BEFORE & AFTER tt IN SUBGROUP II



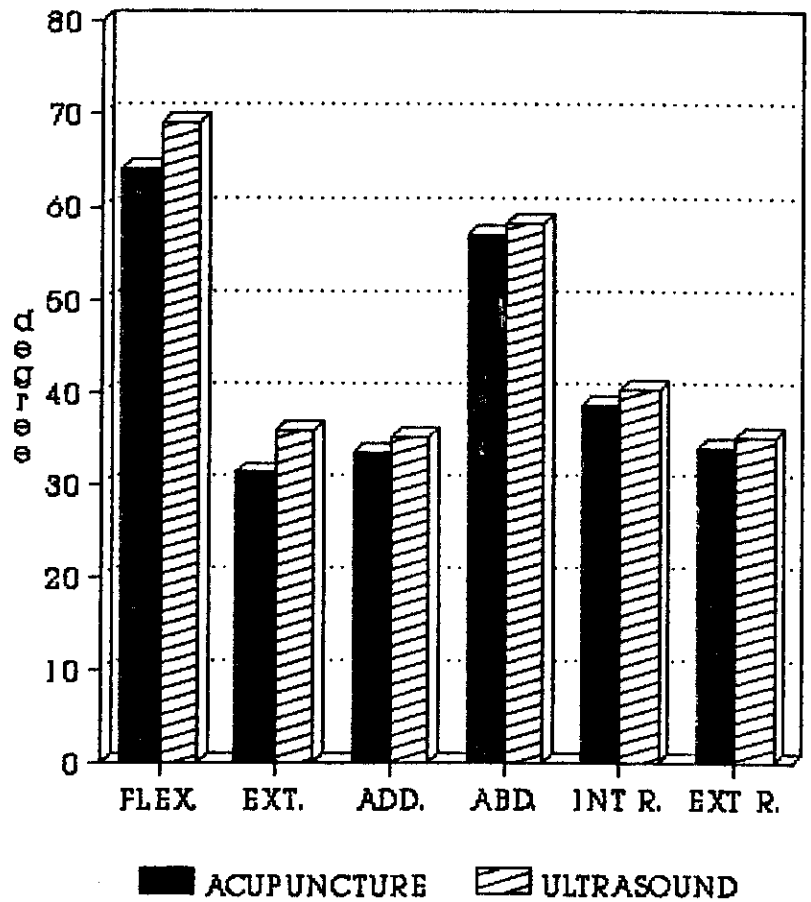
HISTOGRAM 6

THE DIFFERENCE IN CLINICAL SCORES AFTER tft BY ACUPUNCTURE & ULTRASOUND IN GP.A



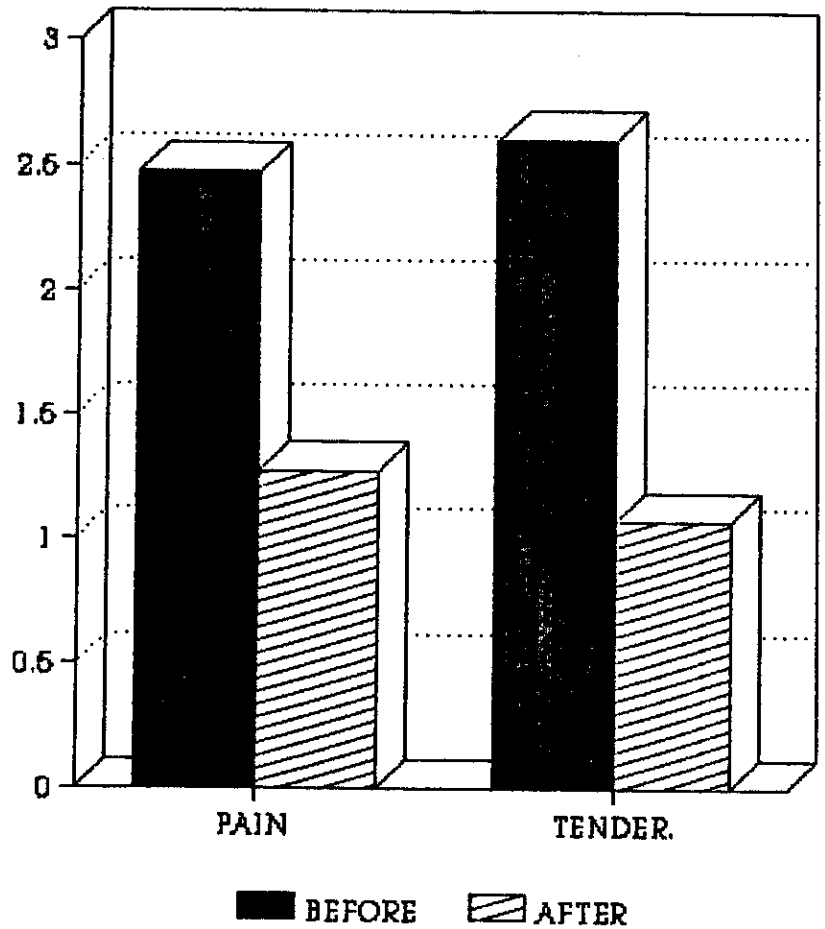
HISTOGRAM 7

THE DIFFERENCE IN PASSIVE RANGE OF MOVE MENT AFTER ttt BY ACUPUN. & U.S.IN GP.B



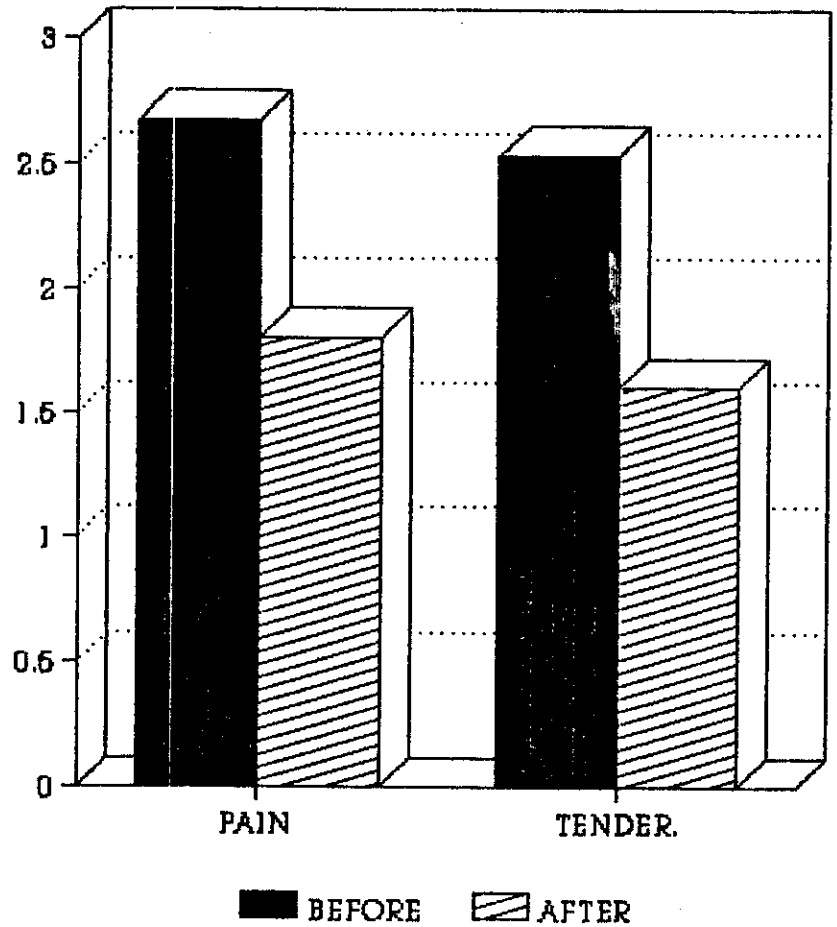
HISTOGRAM 8

THE SCORE VALUES OF CLINCAL PARAMETERS BEFORE & AFTER ttt IN SUBGROUP III



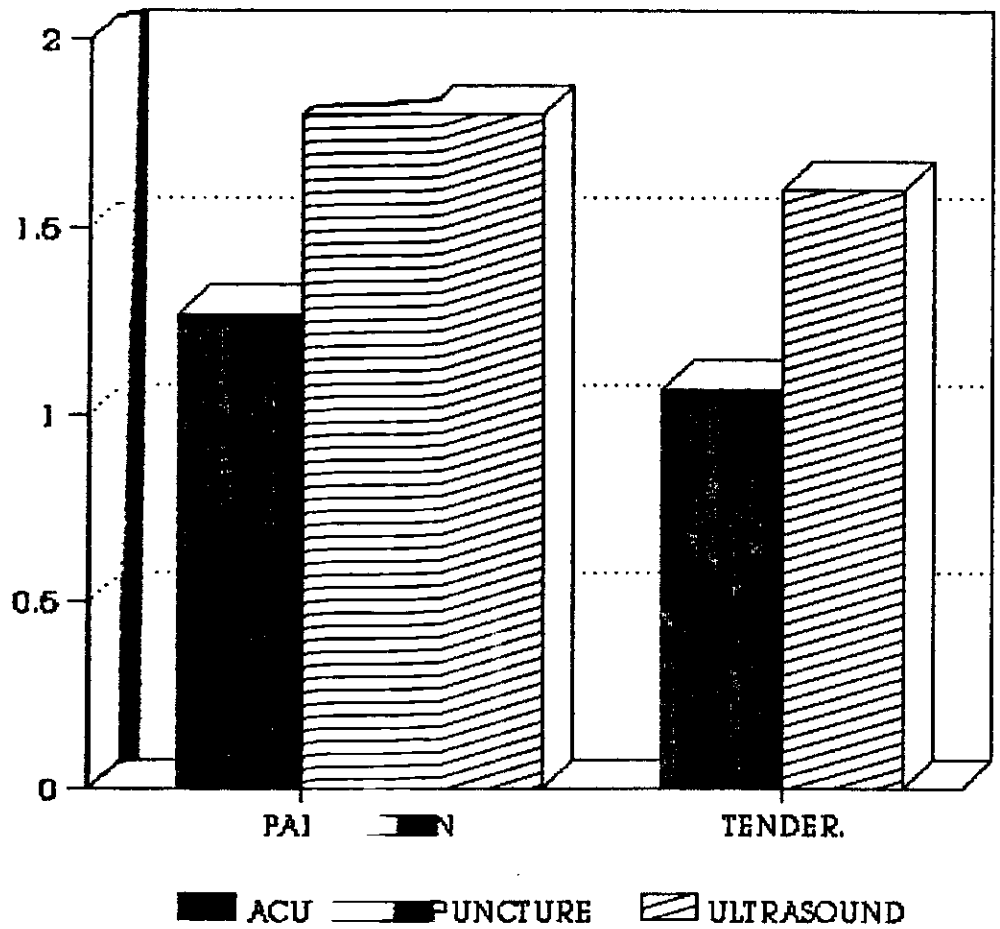
HISTOGRAM 9

THE SCORE VALUES OF CLINCAL PARAMETERS BEFORE & AFTER ttt IN SUBGROUP IV



HISTOGRAM 10

THE DIFFERENCE IN CLINICAL SCORES AFTER
TREATMENT BY ACUPUNCTURE & ULTRASOUND IN GP.B



HISTOGRAM 11