

**Table 1-1. The Changes in body composition between pre and post 36weeks exercise program**

		pre	post	diff	%diff
Age(yrs)	Control	63.4±2.9			
	Exercise	62.6±2.2			
Height(cm)	Control	157.6±2.1			
	Exercise	154.7±3.7			
Weight(kg)	Control	60.5±2.3	60.8±2.4	0.38	0.63
	Exercise	61.2±4.6	59.3±4.4	-1.94**	3.17
%body fat(%)	Control	28.5±1.6	29.4±1.5	0.88*	2.51
	Exercise	28.7±1.7	26.1±1.4	-2.61*	7.52
Body fat(kg)	Control	18.9±1.3	19.5±1.1	0.65*	3.11
	Exercise	18.2±1.7	15.9±1.6	-2.18**	10.28
%LBM(%)	Control	70.5±1.6	69.6±1.5	-0.88*	1.34
	Exercise	69.4±1.7	72.0±1.4	2.60*	3.98
LBM(kg)	Control	42.6±1.8	42.4±2.0	-0.28	0.71
	Exercise	41.0±3.3	41.3±3.2	0.25	0.63
SBP(mmHg)	Control	143.9±10.8	144.8±8.6	0.88	0.61
	Exercise	144.0±19.4	122.8±9.1	-21.25*	14.76
DBP(mmHg)	Control	89.4±9.9	89.5±7.9	0.13	0.15
	Exercise	89.3±11.1	80.9±6.5	-8.38	9.38

Values are mean±standard deviation. Significantly different from pre; \*: p<.05, \*\*:p<.01, LBM, lean body mass; SBP, systolic blood pressure; DBP, diastolic blood pressure.

**Table 1-2. The changes in cardiorespiratory function between pre and post 36weeks exercise program**

		pre	post	diff	%diff
$\dot{V}O_{2max}$ (l/min)	Control	1.31±0.08	1.25±0.10	-0.06*	4.62
	Exercise	1.32±0.16	1.41±0.11	0.09*	6.92
$\dot{V}O_{2max}$ (ml /kg/min)	Control	21.06±0.20	20.93±0.23	-0.13*	0.62
	Exercise	21.62±2.57	23.91±2.06	2.29**	10.60
HRmax(beats/min)	Control	153.1±5.7	149.5±5.0	-3.63*	2.37
	Exercise	149.3±17.7	151.3±24.1	2.00	1.34
O <sub>2</sub> pulse max (ml /beats)	Control	8.22±0.74	8.01±0.85	-0.21*	2.56
	Exercise	8.93±0.99	9.81±1.39	0.88	9.89

Values are mean±standard deviation. Significantly different from pre; \*: p<.05, \*\*:p<.01.  
HRmax, Heart rate maximum.

**Table 1-3. The changes in left ventricular function between pre and post 36weeks exercise program**

		pre	post	diff	%diff
LVDD(cm)	Control	5.01±0.45	4.85±0.38	-0.16	3.20
	Exercise	4.92±0.46	4.82±0.44	-0.10	2.04
LVSD(cm)	Control	3.31±0.23	3.25±0.23	-0.06	1.82
	Exercise	3.13±0.43	2.92±0.27	-0.21	6.77
LVDV(ml)	Control	117.1±22.3	110.1±18.9	-7.14	6.10
	Exercise	109.8±23.1	110.4±21.8	0.63	0.57
LVSV(ml)	Control	43.4±6.7	42.0±6.4	-1.43	3.30
	Exercise	33.8±10.1	33.9±11.2	0.13	0.39
SV(ml)	Control	73.7±16.3	68.0±12.9	-5.71	7.75
	Exercise	76.0±14.9	76.5±11.8	0.50	0.66
CO(l/min)	Control	5.53±1.41	5.21±0.98	-0.22	4.00
	Exercise	5.67±1.13	5.32±0.76	-0.35	6.25
EF(%)	Control	62.7±3.3	61.6±1.9	-1.14	1.82
	Exercise	69.5±4.0	69.6±4.5	0.13	0.19
FS(%)	Control	34.0±2.3	33.1±1.4	-0.86	2.53
	Exercise	37.8±4.2	40.5±2.7	2.68	7.09

Values are mean±standard deviation. LVDD, left ventricular dimension end-diastolic; LVSD, left ventricular dimension end-systolic; LVDV, left ventricular end-diastolic Volume; LVSV, left ventricular end-systolic volume; SV, stroke volume; CO, cardiac output; EF, ejection fraction; FS, fraction shortening.

**Table 1-4. The changes in serum lipids and lipoprotein between pre and post 36weeks exercise program**

		pre	post	diff	%diff
Total-C(mg/dl)	Control	215.8±11.3	224.5±10.5	8.75	4.06
	Exercise	229.6±17.7	199.9±21.2	-29.75**	12.96
TG(mg/dl)	Control	149.6±20.8	154.5±23.3	4.88	3.26
	Exercise	177.6±97.0	132.5±62.9	-45.13*	25.41
HDL-C(mg/dl)	Control	43.9±4.8	42.6±4.3	-1.25	2.85
	Exercise	42.1±8.7	50.8±9.1	8.69**	20.64
LDL-C(mg/dl)	Control	149.3±7.3	150.0±23.3	0.75	0.50
	Exercise	152.0±6.9	122.6±16.4	-29.41**	19.35
AI	Control	4.42±0.94	4.62±0.98	0.20*	4.55
	Exercise	4.76±1.57	3.11±0.91	-1.65**	35.11
Apo A-I (mg/dl)	Control	140.1±15.0	135.5±14.0	-4.63	3.31
	Exercise	142.8±20.8	158.0±22.1	15.2*	10.64
Apo B (mg/dl)	Control	176.8±13.2	180.0±11.1	3.25*	1.84
	Exercise	178.9±13.7	160.4±24.4	-18.50**	10.34

Values are mean±standard deviation. Significantly different from pre; \*:p<.05, \*\*: p<.01. Total-C, total cholesterol; TG, triglyceride; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol AI, atherogenic index; Apo-A1, apolipoprotein A1; Apo-B, apolipoprotein B.

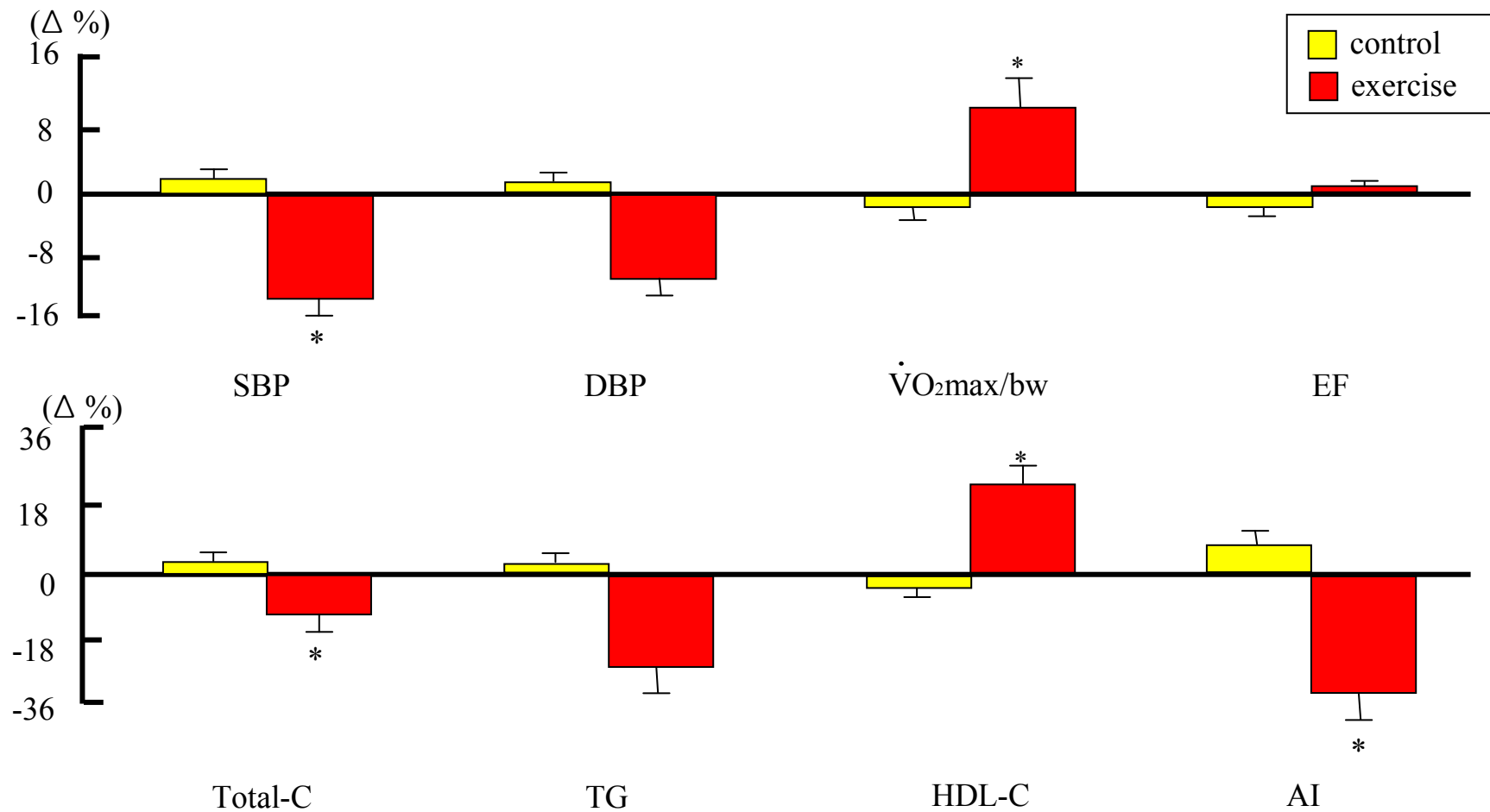


Fig.1. The rate of change from baseline in blood pressure,  $\dot{V}O_{2max}/bw$ , EF, cholesterol and AI. Values are mean  $\pm$  standard deviation. Significantly different between group; \*:  $p < 0.05$ . SBP, systolic blood pressure; DBP, diastolic blood pressure; EF, ejection fraction, Total-C, total cholesterol; TG, triglyceride; HDL-C, high density lipoprotein-cholesterol; AI, Atherogenic index.

**Table 2-1. Physical characteristics of the subjects**

	Control(n=6)	Exercise(n=6)
Age(yrs)	65.6 ± 1.8	65.7 ± 1.2
Height(cm)	155.5 ± 3.3	154.0 ± 3.6
Weight(kg)	62.5 ± 4.9	63.6 ± 4.7
%body fat(%)	28.3 ± 1.1	27.5 ± 2.5
SBP(mmHg)	128.3 ± 14.6	130.1 ± 8.1
DBP(mmHg)	86.7 ± 5.7	88.7 ± 9.8

Values are mean ± standard deviation. SBP, systolic blood pressure:  
DBP, diastolic blood pressure

**Table. 2-2. The changes in body composition and cardiorespiratory function between pre and post 16 weeks exercise program**

		pre	post	diff	%diff
Weight(kg)	Control	62.5 ± 4.9	62.8 ± 4.3	0.30	0.48
	Exercise	63.6 ± 4.7	61.4 ± 4.9	-2.21**	3.47
%body fat(%)	Control	28.3 ± 1.1	29.3 ± 2.2	1.02	2.97
	Exercise	27.5 ± 2.5	25.1 ± 4.8	-2.40**	7.16
$\dot{V}O_2$ max(l/min)	Control	1.28 ± 0.16	1.26 ± 0.10	-0.02	1.56
	Exercise	1.29 ± 0.14	1.35 ± 0.10	0.06**	4.65
$\dot{V}O_2$ max(ml /kg/min)	Control	19.51 ± 1.52	19.64 ± 0.91	0.13	0.67
	Exercise	19.61 ± 3.71	20.79 ± 3.62	1.18*	6.03
HRmax( beats/min)	Control	154.6 ± 6.5	152.6 ± 6.6	-2.00	1.29
	Exercise	152.2 ± 5.1	155.4 ± 5.1	3.26	2.14

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05, \*\*:p<.01.  
HRmax, Heart rate maximum.

**Table. 2-3. The changes in lymphocyte number and lymphocyte proliferation between pre and post 16 weeks exercise program**

		pre	post	diff	%diff
Lymphocyte number( $10^3/\mu\ell$ )	Control	$1.81 \pm 0.25$	$2.12 \pm 0.41$	0.31	17.13
	Exercise	$1.92 \pm 0.36$	$2.52 \pm 0.82$	0.60	31.25
Lymphocyte proliferation(%)	Control	$32.4 \pm 6.9$	$33.4 \pm 9.6$	1.08	3.34
	Exercise	$31.6 \pm 5.9$	$41.7 \pm 4.9$	10.10**	31.92

Values are mean  $\pm$  standard deviation. Significantly different from pre; \*\*:p<.01



**Table. 2-4. The changes in lymphocyte subset and NK cell between pre and post 16 weeks exercise program**

		pre	post	diff	%diff
T-cell( $10^3/\mu\ell$ )	Control	$0.69 \pm 0.17$	$0.82 \pm 0.20$	0.13	17.91
	Exercise	$0.67 \pm 0.16$	$0.92 \pm 0.21$	0.25	37.78
T-helper cell( $10^3/\mu\ell$ )	Control	$0.44 \pm 0.09$	$0.44 \pm 0.11$	0.01	0.02
	Exercise	$0.45 \pm 0.07$	$0.68 \pm 0.20$	0.23	52.00
T-suppressor cell( $10^3/\mu\ell$ )	Control	$0.71 \pm 0.20$	$0.82 \pm 0.23$	0.11	15.94
	Exercise	$0.72 \pm 0.24$	$0.67 \pm 0.22$	-0.05	7.44
T-helper/T-suppressor	Control	$0.65 \pm 0.12$	$0.55 \pm 0.10$	-0.10	15.91
	Exercise	$0.68 \pm 0.23$	$1.04 \pm 0.27$	0.36*	53.30
NK cell( $10^3/\mu\ell$ )	Control	$0.34 \pm 0.18$	$0.32 \pm 0.16$	-0.02	6.99
	Exercise	$0.41 \pm 0.18$	$0.53 \pm 0.21$	0.12	27.84

Values are mean  $\pm$  standard deviation. Significantly different from pre; \*:p<.05

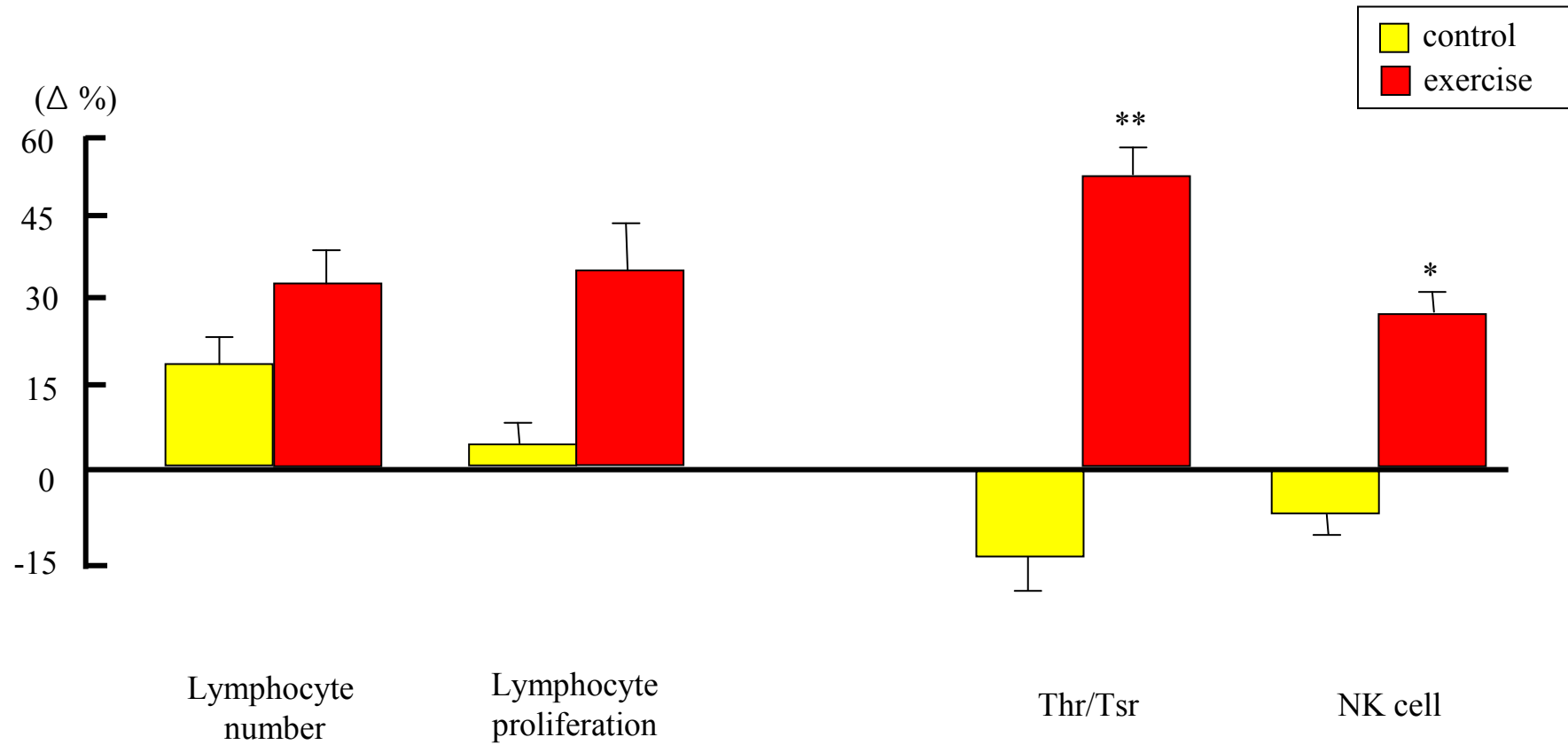


Fig.2. The rate of change from baseline in lymphocyte, Thr/Tsr and NK cell.

Values are mean  $\pm$  standard deviation. Significantly different between group; \*:p<.05, \*\*:p<.01.

Thr/Tsr, T-helper cell/T suppressor cell; NK cell, natural killer cell.

**Table 3-1. Physical characteristics of the subjects**

Parameter	Control(n=17)	Exercise(n=18)
Age(years)	67.0±0.9	66.1±1.1
Height(cm)	158.0±5.2	155.5±4.0
Weight(kg)	58.3±4.1	59.2±3.1
Lean body mass(kg)	39.6±3.3	40.0±2.7
Body fat(kg)	17.3±2.9	17.9±3.4

Values are mean ± standard deviation.

**Table 3-2. The combined exercise program**

	<b>Event</b>	<b>Time</b>
<b>Warming-up</b>	<b>Manual stretching</b>	
<b>Back extension strengthening</b>	<b>Initially-sitting in a chair(prone) Training with equipment</b>	<b>15min</b>
<b>Weight bearing exercise</b>	<b>Walking Low-impact aerobics Step aerobics</b>	<b>23min</b>
<b>Balance training</b>	<b>Frenkel's exercise Gait training with dance(side walk, tandem walk)</b>	<b>12min</b>
<b>Posture correction</b>	<b>Flat back exercise Wall stretch Chin tucks</b>	<b>10min</b>
<b>Cooling down</b>	<b>Manual stretching</b>	

**Table 3-3. The changes in body sway between pre and post 36 weeks exercise program**

		pre	post	diff	%diff
Mean of LNG(cm)	Control	54.3±7.6	55.3±6.5	1.01	1.84
	Exercise	55.4±8.5	37.6±6.2	-17.81*	32.16
Mean of LNG/time (cm/sec)	Control	1.77±0.01	1.83±0.01	0.06	3.57
	Exercise	1.81±0.03	1.55±0.02	-0.26*	14.43
Mean of DEV of MX (cm/sec)	Control	1.26±0.01	1.20±0.01	-0.06	4.95
	Exercise	1.26±0.03	0.98±0.02	-0.28*	22.54
Mean of DEV of MY (cm/sec)	Control	1.10±0.01	1.11±0.01	0.01	0.85
	Exercise	1.06±0.02	0.91±0.01	-0.15	13.79

Values are mean±standard deviation. Significantly different from pre; \*: p<.05. LNG, length; DEV of MX, deviation of mean X; DEV of MY, deviation of mean Y.

**Table. 3-4. The changes in bone mineral density, body composition and cardiorespiratory function pre pre and post 36 weeks exercise program**

		pre	post	diff	%diff
<b>Bone mineral density</b>					
spine(L2-L4)(g/cm <sup>2</sup> )	Control	0.94 ± 0.06	0.94 ± 0.06	-	-
	Exercise	0.93 ± 0.14	0.96 ± 0.14	0.03	3.23
femoral neck(g/cm <sup>2</sup> )	Control	0.71 ± 0.03	0.68 ± 0.05	-0.03	4.23
	Exercise	0.73 ± 0.06	0.78 ± 0.03	0.05*	6.84
ward's triangle(g/cm <sup>2</sup> )	Control	0.62 ± 0.08	0.63 ± 0.02	0.01	1.61
	Exercise	0.66 ± 0.02	0.67 ± 0.02	0.01	1.52
trochanter(g/cm <sup>2</sup> )	Control	0.64 ± 0.07	0.65 ± 0.04	0.01	1.56
	Exercise	0.69 ± 0.04	0.71 ± 0.03	0.02*	2.90
<b>Body composition</b>					
%body fat(%)	Control	27.8 ± 1.7	29.7 ± 2.3	1.90	5.62
	Exercise	28.7 ± 2.1	28.6 ± 3.2	-0.01	0.03
lean body mass(kg)	Control	39.8 ± 3.3	38.6 ± 5.4	-1.20	3.17
	Exercise	40.0 ± 2.7	40.1 ± 3.9	0.10	0.26
<b>Pulmonary function</b>					
VO <sub>2</sub> max(ml/kg/min)	Control	22.52 ± 4.13	22.12 ± 6.31	-0.40	1.78
	Exercise	20.23 ± 3.62	23.43 ± 4.64	3.20*	15.84

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05

**Table. 3-5. The changes in bone metabolic marker and hormone between pre and post 36 weeks exercise program**

		pre	post	diff	%diff
Intact-PTH (pg/ml)	Control	19.2±2.1	24.2±1.3	5.01	26.04
	Exercise	11.5±3.7	12.3±4.6	0.82	6.96
Osteocalcin (ng/ml)	Control	10.1±0.7	10.9±3.8	0.84	7.92
	Exercise	7.82±2.11	8.83±0.92	1.01	12.82
Deoxypyridinoline (ng/ml)	Control	7.21±1.41	10.23±6.52	3.02	41.67
	Exercise	7.13±1.02	4.92±2.65	-2.21*	30.99

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05.  
Intact-PTH, Intact parathyroid hormone.

**Table 3-6. The changes in gait ability and eyes closed one legged stand between pre and post 36 weeks exercise program**

		pre	post	diff	%diff
Maximal step length(cm)	Control	96.0±4.2	95.0±5.8	-1.00	1.04
	Exercise	95.0±8.1	103.0±9.4	8.00*	8.42
10m maximal walk time(sec)	Control	6.45±0.23	6.31±0.21	-0.14	2.17
	Exercise	6.67±0.42	5.79±0.73	-0.88*	13.19
Eyes closed one legged stand(sec)	Control	12.9±3.4	13.9±2.1	1.00	7.75
	Exercise	11.9±4.2	15.6±5.1	3.70*	31.09

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05



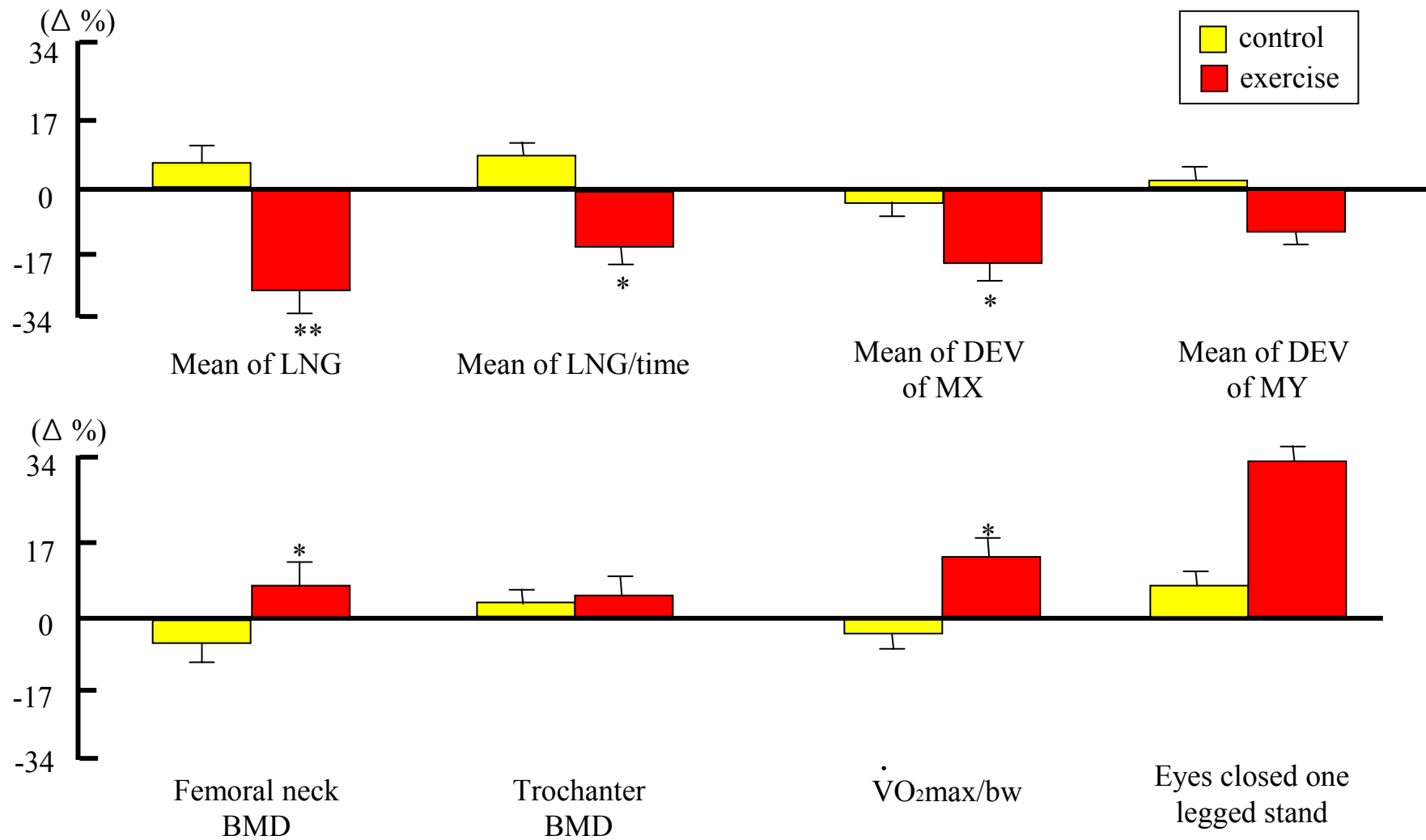


Fig.3. The rate of change from baseline in body sway, BMD,  $\dot{V}O_2\text{max}/\text{bw}$  and eyes closed one legged stand.

Values are mean  $\pm$  standard deviation. Significantly different between group; \*:p<.05, \*\*:p<.01.

LNG, length; DEV of MX, deviation of mean X; DEV of MY, deviation of mean Y.

**Table 4-1. Physical characteristics of the subjects**

	Control(n=7)	Exercise(n=7)
Age(yrs)	62.9±1.4	63.6±2.1
Height(cm)	154.9±5.4	156.2±4.1
Weight(kg)	59.4±5.9	60.3±3.8
%body fat(%)	27.8±3.3	27.1±2.1
Waist-hip ratio	0.93±0.06	0.91±0.05

Values are mean ± standard deviation.

**Table 4-2. The changes in cardiorespiratory function pre and post 36 weeks exercise program**

		pre	post	diff	%diff
$\dot{V}O_2\text{max}(\text{L}/\text{min})$	Control	1.12±0.24	1.13±0.31	0.01	0.91
	Exercise	1.32±0.19	1.42±0.19	0.10*	7.69
$\dot{V}O_2\text{max}(\text{ml}/\text{kg}/\text{min})$	Control	20.30±3.26	20.10±3.05	-0.20	0.99
	Exercise	20.01±3.22	21.11±2.77	1.10*	5.50
$\dot{V}O_2\text{max}/\text{LBM}(\text{ml} / \text{kg}/\text{min})$	Control	28.12±6.01	28.92±7.33	0.80	2.85
	Exercise	31.10±5.02	34.90±7.11	3.80**	12.22
$O_2$ pulse max(ml /beats)	Control	8.03±2.24	8.02±2.01	0.01	0.13
	Exercise	7.94±1.07	8.94±1.67	1.00*	12.66

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05, \*\*: p<.01.

LBM, lean body mass

**Table 4-3. The changes in serum lipid and apolipoprotein between pre and post 8weeks exercise program**

		pre	post	diff	%diff
Total-C(mg/dl)	Control	246.4±14.4	253.3±17.5	6.92	2.80
	Exercise	237.9±14.4	208.5±16.6	-29.43***	12.36
TG(mg/dl)	Control	185.4±30.5	185.3±25.8	-0.11	0.05
	Exercise	187.9±15.8	175.8±15.7	-12.10*	6.44
LDL-C(mg/dl)	Control	151.4±14.6	154.7±14.1	3.32	2.18
	Exercise	150.9±19.8	134.7±19.6	-16.21*	10.74
HDL-C(mg/dl)	Control	43.9±5.5	43.1±5.4	-0.80	1.82
	Exercise	42.8±6.1	49.3±5.8	6.52*	15.19
AI	Control	4.71±0.77	5.05±1.08	0.34	6.38
	Exercise	4.62±0.90	3.31±0.54	-1.31***	28.26
Apo A- I (mg/dl)	Control	132.6±13.1	131.6±11.8	-1.03	0.75
	Exercise	134.5±8.5	145.6±14.9	11.12*	8.25
Apo B (mg/dl)	Control	186.3±18.2	187.9±15.1	1.62	0.86
	Exercise	181.0±25.8	168.9±24.7	-12.10*	6.69

Values are mean ± standard deviation. Significantly different from pre; \*: p<.05, \*\*\* : p<.001. Total-C, total cholesterol; TG, triglyceride; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; AI, Atherogenic index; Apo-A1, Apolipoprotein A1; Apo-B, Apolipoprotein B

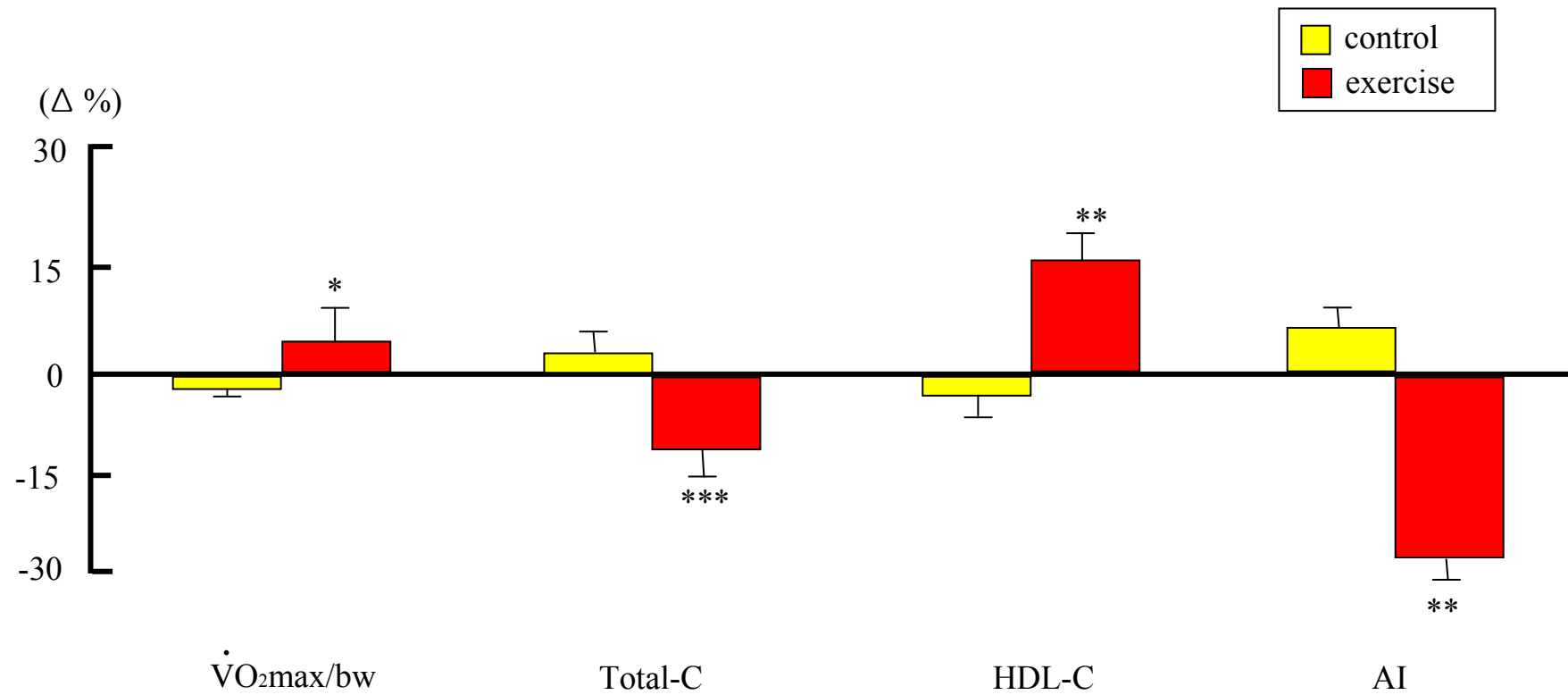


Fig.4. The rate of change from baseline in  $\dot{V}O_{2max}/bw$ , Total-C, HDL-C and AI.

Values are mean  $\pm$  standard deviation.

Significantly different between group; \*:p<.05. \*\*:p<.01, \*\*\*:p<.001,

Total-C, total cholesterol; HDL-C, high density lipoprotein-cholesterol; AI, Atherogenic index.

**Table 5-1. Physical characteristics of the subjects**

	Control(n=12)	Exercise(n=12)
Age(yrs)	63.8±1.4	64.1±1.3
Height(cm)	158.4±1.7	157.9±2.5
Weight(kg)	55.2±3.1	56.6±4.0
BMI(kg/m <sup>2</sup> )	20.7±1.3	21.8±1.6
HD(month)	78.3±11.8	80.1±8.3
SBP(mmHg)	157.3±8.2	160.3±7.9
DBP(mmHg)	102.7±4.1	105.1±4.2

Values are mean±standard deviation. BMI, body mass index; HD, duration after onset of hypertension; SBP, systolic blood pressure; DBP, diastolic blood pressure

**Table 5-2. The changes in blood pressure control-hormone level between pre and post 24 weeks exercise program**

		pre	post	diff	%diff
Norepinephrine (pg/ ml)	Control	201.6±10.8	203.3±9.5	1.75	0.87
	Exercise	203.3±8.8	178.1±12.3	-25.25*	12.42
Renin (ng/ ml /hr)	Control	2.01±0.14	2.06±0.12	0.05	2.49
	Exercise	2.38±0.72	1.03±0.18	-1.36*	57.14
Angiotensin II (pg/ ml)	Control	48.5±3.3	49.9±3.7	1.42	2.93
	Exercise	50.1±3.0	29.3±3.7	-20.33*	40.60
Aldosterone (ng/ ml)	Control	13.1±1.2	13.5±1.1	0.42	3.21
	Exercise	12.3±1.5	8.5±1.2	-3.87*	31.39
$\alpha$ -ANP (pg/ ml)	Control	23.3±2.8	25.1±3.1	1.75	7.50
	Exercise	21.2±5.3	15.0±3.0	-6.18*	29.19

Values are mean  $\pm$  standard deviation. Significantly different from pre; \*:  $p < .05$ .  
 $\alpha$ -ANP,  $\alpha$ -Atrial natiuretic peptide

**Table 5-3. The changes in blood pressure, cardiac function and  $\dot{V}O_2$ max between pre and post 24 weeks exercise program**

		pre	post	diff	%diff
SBP (mmHg)	Control	157.3±8.2	162.2±5.89	4.91	3.12
	Exercise	154.3±7.9	128.4±7.4	-25.95**	16.80
DBP (mmHg)	Control	102.7±4.1	104.3±3.6	1.67	1.63
	Exercise	100.1±4.2	89.3±3.6	-10.83**	10.80
LVDD (cm)	Control	4.73±0.15	4.74±0.18	0.01	0.21
	Exercise	4.85±0.36	4.87±0.38	0.02	0.41
LVSD (cm)	Control	3.04±0.16	3.06±0.16	0.02	0.66
	Exercise	3.21±0.24	3.09±0.20	-0.12	3.74
LVDV (ml)	Control	108.1±11.9	107.1±12.0	-1.00	0.93
	Exercise	114.3±15.2	115.3±15.1	0.92	0.81
LVSV (ml)	Control	37.4±5.2	37.1±5.2	-0.25	0.67
	Exercise	38.6±6.3	36.0±6.1	-2.58	6.69
LVmass (g)	Control	145.3±13.3	143.3±13.5	-2.00	1.38
	Exercise	147.8±24.4	152.8±21.6	5.00	3.38
SV (ml)	Control	73.6±7.8	73.1±8.8	-0.50	0.68
	Exercise	68.3±6.2	70.8±4.2	2.58	3.78
EF (%)	Control	66.1±2.5	64.6±3.3	-1.38	2.09
	Exercise	66.3±3.7	68.4±2.8	2.17	3.28
FS (%)	Control	35.1±1.8	34.6±1.5	-0.50	1.42
	Exercise	37.9±2.8	40.2±2.3	2.25*	5.93
$\dot{V}O_2$ max (l/min)	Control	1.31±0.05	1.27±0.06	-0.04	3.05
	Exercise	1.43±0.08	1.63±0.11	0.20*	13.99
$\dot{V}O_2$ max (ml/kg/min)	Control	22.94±1.31	21.61±1.40	-1.33	5.80
	Exercise	24.44±2.63	30.92±3.01	6.48**	26.51
HRmax (beats/min)	Control	153.0±5.8	152.0±5.6	-1.00	0.65
	Exercise	152.9±4.2	153.7±3.9	0.80	0.52

Values are mean ± standard deviation. Significantly different from pre; \*, p<.05, \*\* p<.01. SBP, systolic blood pressure; DBP, diastolic blood pressure; LVDD, left ventricular dimension end-diastolic; LVSD, left ventricular dimension end-systolic; LVDV, left ventricular end-diastolic volume; LVSV, left ventricular end-systolic volume; SV, stroke volume; EF, ejection fraction; FS, fraction shortening



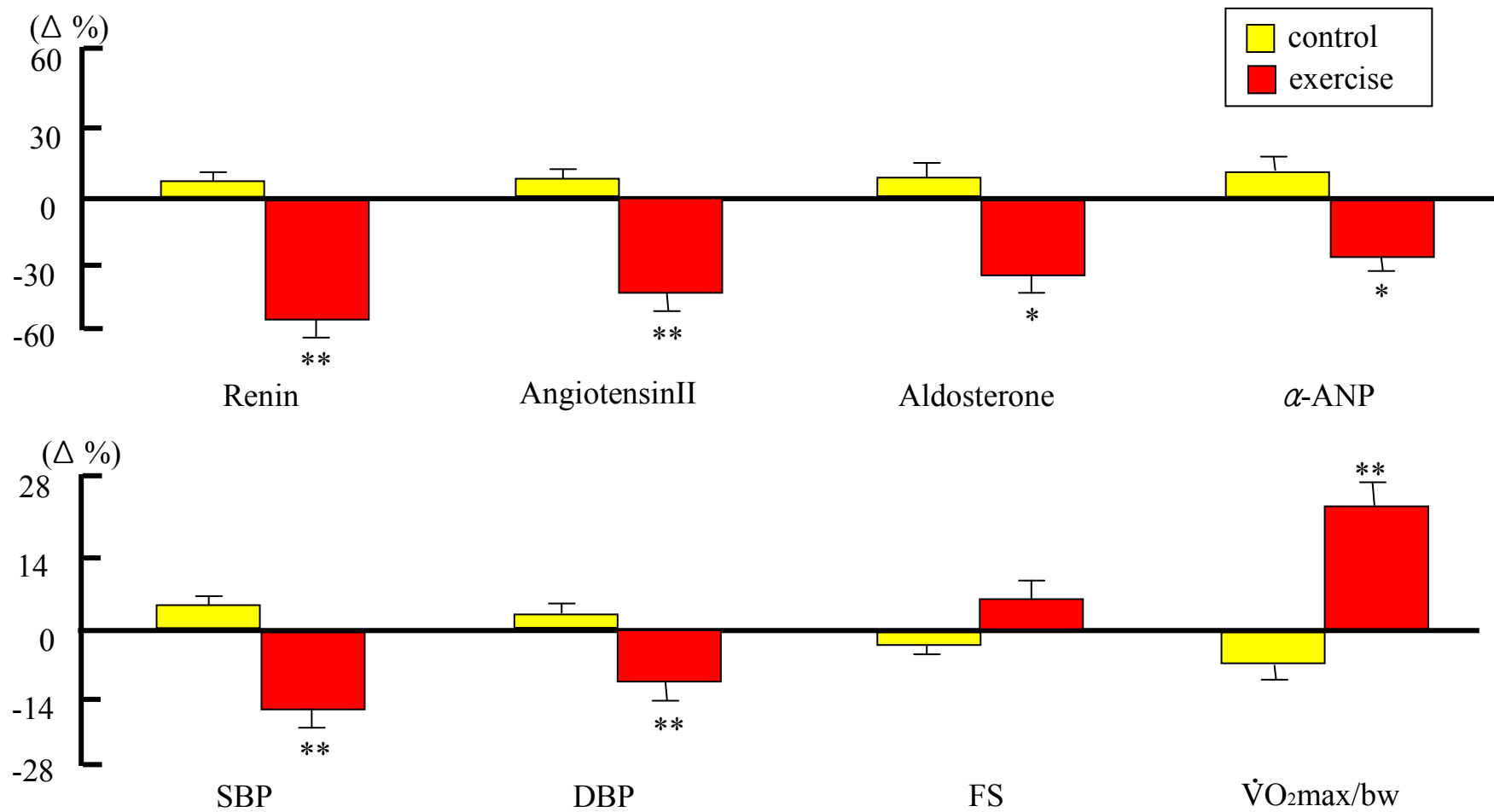


Fig.5. The rate of change from baseline in blood pressure control-hormone level, blood pressure, FS and  $\dot{V}O_2\text{max}/\text{bw}$ .

Values are mean  $\pm$  standard deviation. Significantly different between group; \*;  $p < .05$ , \*\*;  $p < .01$ .

$\alpha$ -ANP,  $\alpha$ -atrial natriuretic peptide, SBP, systolic blood pressure; DBP, diastolic blood pressure; FS, fraction shortening