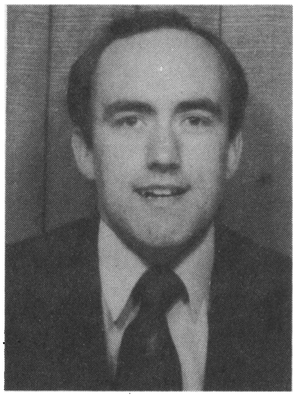
significant difference (.01 level) between events when the lactate values were treated by ANOVA (Table 3). ANOVA revealed a no-difference effect (.01 level of significance) between event-resting lactate values.

THE EFFECTS OF PLYOMETRIC TRAINING ON THE VERTICAL JUMP PERFORMANCE OF ADULT FEMALE SUBJECTS

B. P. Miller

Bedford College of Higher Education



B. Miller

The aim of this study was to investigate the contention that a programme of plyometric exercises would improve the vertical jump performance of adult females.

Twenty-four female physical education students acted as subjects (Ss) and performed a standardised vertical jump test prior to being assigned to one of two groups. The mean vertical jump score was the same for each group. Group I trained with plyometric exercises and Group II acted as a control.

Ss in the plyometric training group trained once a week for eight weeks. They performed five sets of 10 repetitions of depth jumps from a height of 50 cms. All Ss were re-tested at the end of the eight week period. Results showed that Group I had improved their vertical jump performance by more than 5 cms ($t = 2.89$, $df = 22$, $p < 0.01$), whilst Group II showed no significant change.

In view of the results obtained in this study, it was suggested that sportswomen should consider the possible benefits of including depth jumping in a balanced conditioning programme. While Sinclair (1981) has emphasised that an adequate build-up of strength is required prior to undertaking such a regime, and Miller and Power (1981) have stated that depth jumps should be performed on to a gymnastic mat, it is concluded that a gradual introduction to the activity is unlikely to cause injuries.

References

Miller, B. P. and Power, S. L. D., 1981 "Developing power in athletes through the process of depth jumping". Athletics Coach 15 (2): 10-15.

Sinclair, A., 1981 "A reaction to depth jumping". Sports Coach 5 (2): 24-25.

ECHOCARDIOGRAPHIC LEFT VENTRICULAR DIMENSIONS IN TWO GROUPS OF ROAD RACE CYCLISTS DURING A TRAINING SEASON

L. Fananapazir*, B. Ryan-Woolley*, C. Ward* and J. A. White**

**Regional Cardiac Centre, Wythenshawe Hospital, Manchester M23 9LT*
***Human Performance Laboratory, Salford University, Salford M5 4WT*

Left ventricular dimensions were measured echocardiographically, in a group of 19 competitive cyclists and in a group of 19 untrained subjects matched for age and sex. The cyclists were divided into two age groups:

Group 1 — < 20 years: mean, 18 years, (range 17 to 19 years), n=10 and
Group 2 — > 20 years: mean, 26 years, (range 22 to 36 years), n=9.

The two groups followed similar training programmes but the older group had had perforce a longer experience of cycling. Measurements were made at the beginning and end of the competitive season.

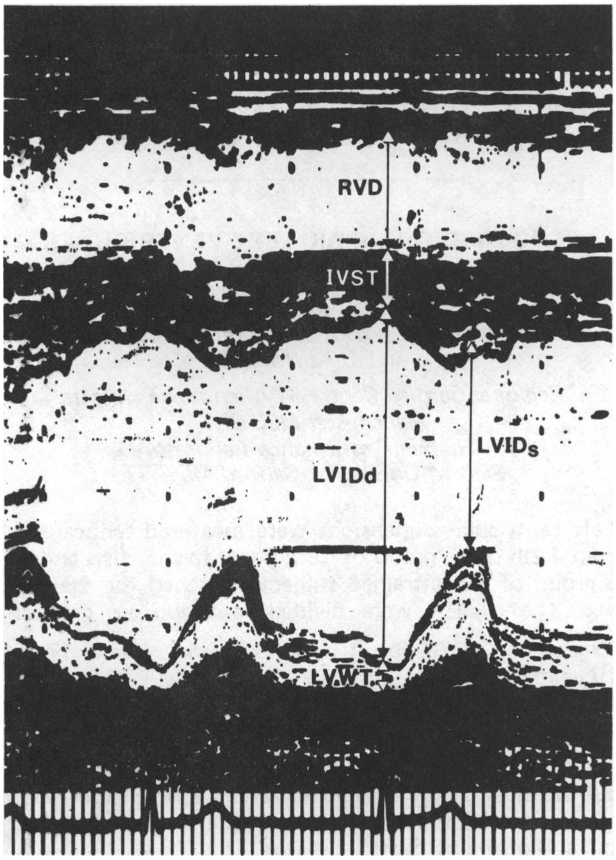
The pre-training left ventricular dimensions were significantly greater ($p < 0.02$) in both groups of athletes compared with the controls (Table).

		LVIDd	LVIDs	LVWT	LV mass	Δ LV mass / Δ LV vol
Group 1 n=10	Pre-training	5.2 ± 0.4	3.4 ± 0.4	0.8 ± 0.1	180 ± 39	4.6
	Post-training	5.5 ± 0.5	3.5 ± 0.5	1.3 ± 0.1	360 ± 56	
Group 2 n=9	Pre-training	5.5 ± 0.7	3.4 ± 0.1	1.0 ± 0.2	260 ± 92	3.5
	Post-training	5.6 ± 0.4	3.6 ± 0.4	1.3 ± 0.2	380 ± 79	
Controls n=19		4.7 ± 0.5	3.2 ± 0.4	0.8 ± 0.2	150 ± 61	

LVID = Left ventricular internal diameter
LVWT = Left ventricular posterior wall thickness

Left ventricular changes result from this type of athletic training were reflected largely in an increase in left ventricular mass rather than left ventricular volumes. On average the athletes increased their left ventricular

Echocardiographic trace of a racing cyclist.



RVD *Right Ventricular Dimension*
IVST *Inter Ventricular Septal Thickness*
LVIDd *Left Ventricular Internal Dimension (diastole)*
LVIDs *Left Ventricular Internal Dimension (systole)*
LVWT *Left Ventricular Wall Thickness*

mass by 82 per cent and their left ventricular volumes by 20 per cent.

The cardiac adaptive changes to exercise were significantly different ($p < 0.02$) in the two age groups of cyclists. The older age group had larger left ventricular volumes and mass at the start of the season, but the changes in these parameters, as a result of training were more striking in the younger age group, by the end of the season (Table)

PHYSIOLOGICAL AND SLEEP PATTERN RESPONSES TO A SUCCESSFUL ATTEMPT ON THE WORLD RECORD FOR CONTINUOUS WALKING

Ann Daggett*, B. Davies*, C. Shapiro** and P. Jakeman†

**Metabolic Profile Laboratory, University of Salford*
***Dept. of Psychiatry, Royal Edinburgh Hospital*
†Dept. of Sports Studies,
Crewe and Alsager College of Higher Education

Physiological responses to 130 hours of non-stop walking and sleep deprivation were recorded during and following a successful attempt on the world continuous walking record by an experienced and highly trained male walker (aged 47 years).

Heart rate, monitored continuously throughout the marathon walk, averaged 160 b/min over the 6 days and 5 nights. The subject walked at approximately 55% of maximum oxygen uptake (VO_2 max), with lactate levels remaining below 2 mmol/l. The total distance walked was 338.2 miles at a mean rate of 3.5 mph during the first 24 hours, declining to 2 mph over the final 24 hours.

Creatine kinase (CK) efflux reflected the changes in walking intensity, and the ratio of creatine kinase MB to total CK (CK-MB/CK%) indicated no evidence of cardiac ischaemia. Urine catecholamine levels rose throughout the walk period, with adrenaline, noradrenaline and dopamine increasing 9, 7 and 10 fold, respectively.

Adrenaline remained high during the 3 day recovery phase, whereas nor-adrenaline and dopamine had returned to their resting levels after 20 hours. Serum electrolyte changes were within normal ranges, and growth hormone (GH) and prolactin (PRL) were raised but variable throughout the walk phase. Haemoglobin (Hb) and pack cell volume (PCV) levels decreased from 13.0-11.6 g/dl and 42-34% respectively.

Following the walk, the subject demonstrated very short sleep latency, rapid entry into slow wave sleep (SWS) and rises in GH. The relative and absolute demands of SWS remained high for 3 nights. Total GH on the first post-walk day was increased 93% above baseline levels recorded during sleep, when the subject was not training. The extreme increase in SWS and rise in GH supports the sleep restorative hypothesis of GH release post-exercise and following sleep deprivation.

It would seem that a walk of this intensity is well within the physiological capabilities of an individual's aerobic capacity. However, the enormous psychological factor in overcoming sleep-deprivation is clearly illustrated in the post-exercise sleep patterns.