

The Additive Blood Pressure Lowering Effects of Intensity on Postexercise Hypotension

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Introduction

- Aerobic exercise training is shown to reduce blood pressure (BP) by average of 5-7 mmHg¹.
- A significant portion of these BP lowering effects of aerobic exercise programs result from the acute BP benefits from a single exercise session, which is known as postexercise hypotension (PEH)².

¹Pescatello et al. (2004). *Med Sci Sports Exerc*, 25:533-53.

²Thompson et al. (2001). *Med Sci Sports Exerc*, 33:S348-45.

Introduction

- 32 subjects
 - 8 men/8 women Stage I/II hypertensive (HT)
 - 8 men/8 women non-hypertensive (NHT)
- 50% and 75% peak oxygen consumption (VO_2 peak)
- A greater and longer-lasting BP reduction seen after 75% VO_2 peak

Introduction

- 49 men with High Normal to Stage I Hypertension
- 40% and 60% $\dot{V}O_2$ peak
- No difference in BP reduction between 40% and 60% $\dot{V}O_2$ peak

Pescatello et al. (2004). *J Hypertens*. 22, 1881-1888.

Pescatello et al. (1991). *Circulation*. 83, 1557-1561.

Purpose

To examine the effects of low (40% $\dot{V}O_2$ peak), moderate (60% $\dot{V}O_2$ peak), and vigorous ($\dot{V}O_2$ peak) exercise intensity on the immediate blood pressure lowering effects of exercise as compared to a control session of seated rest

Hypothesis

- Low (40% $\dot{V}O_2$ peak) and moderate (60% $\dot{V}O_2$ peak) exercise intensity will elicit greater BP reductions than vigorous ($\dot{V}O_2$ peak) exercise intensity.

Subjects

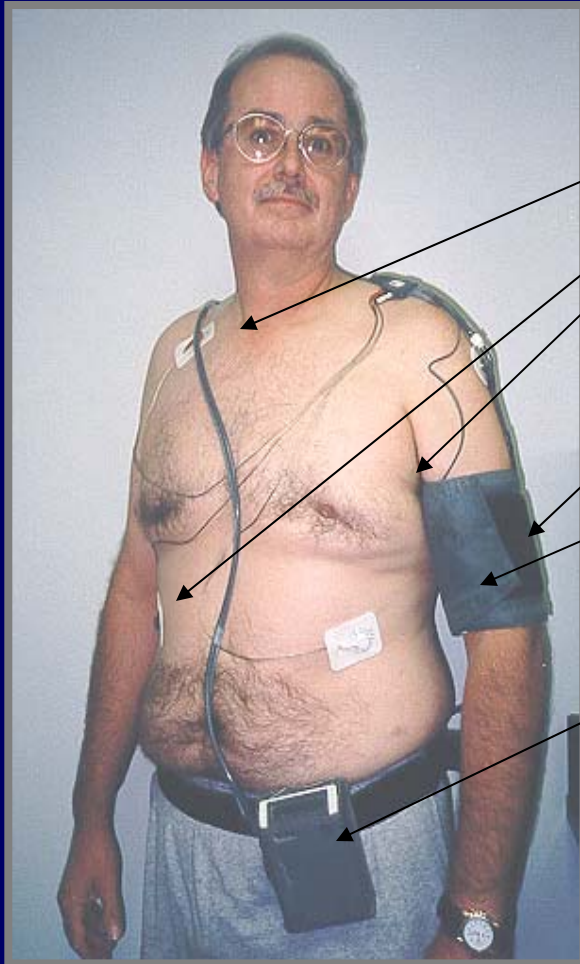
- 45 healthy men
- Caucasian
- 18-55 years
- High Normal to Stage I Hypertension (Systolic BP [SBP] 130-159 mmHg and/or Diastolic BP [DBP] 85-99mmHg)

Study Design Overview

Orientation Session



Ambulatory Blood Pressure Monitoring



3 Electrodes

Blood Pressure Cuff

Microphone

Blood Pressure Pump
& Data Storage

Four Experiment Sessions

- VO_2 peak determined by a graded cardiopulmonary exercise stress test (GXT).



Four Experimental Sessions

CONTROL

Seated Rest

Total Time 40 min

VIGOROUS

VO_2 peak

GXT

LOW

40% VO_2 peak

30 min

Total Time 40 min

Baseline

20 min

MODERATE

60% VO_2 peak

30 min

Total Time 40 min



Statistical Analyses

- Means \pm SEM were generated on all study variables
- RMANOVA tested if BP differed over time among experimental conditions
- SPSS 14.0 for Windows
- $p < 0.05$

Mean (\pm SEM) Subject Characteristics (n=45)

Age (yr)	43.9 \pm 1.4
Ambulatory SBP (mmHg)	139.2 \pm 1.1
Ambulatory DBP (mmHg)	90.3 \pm 1.3
Body Mass Index (kg/m ²)	29.5 \pm 0.7

Figure 1a Mean Change in Awake SBP from Baseline over 9 hr

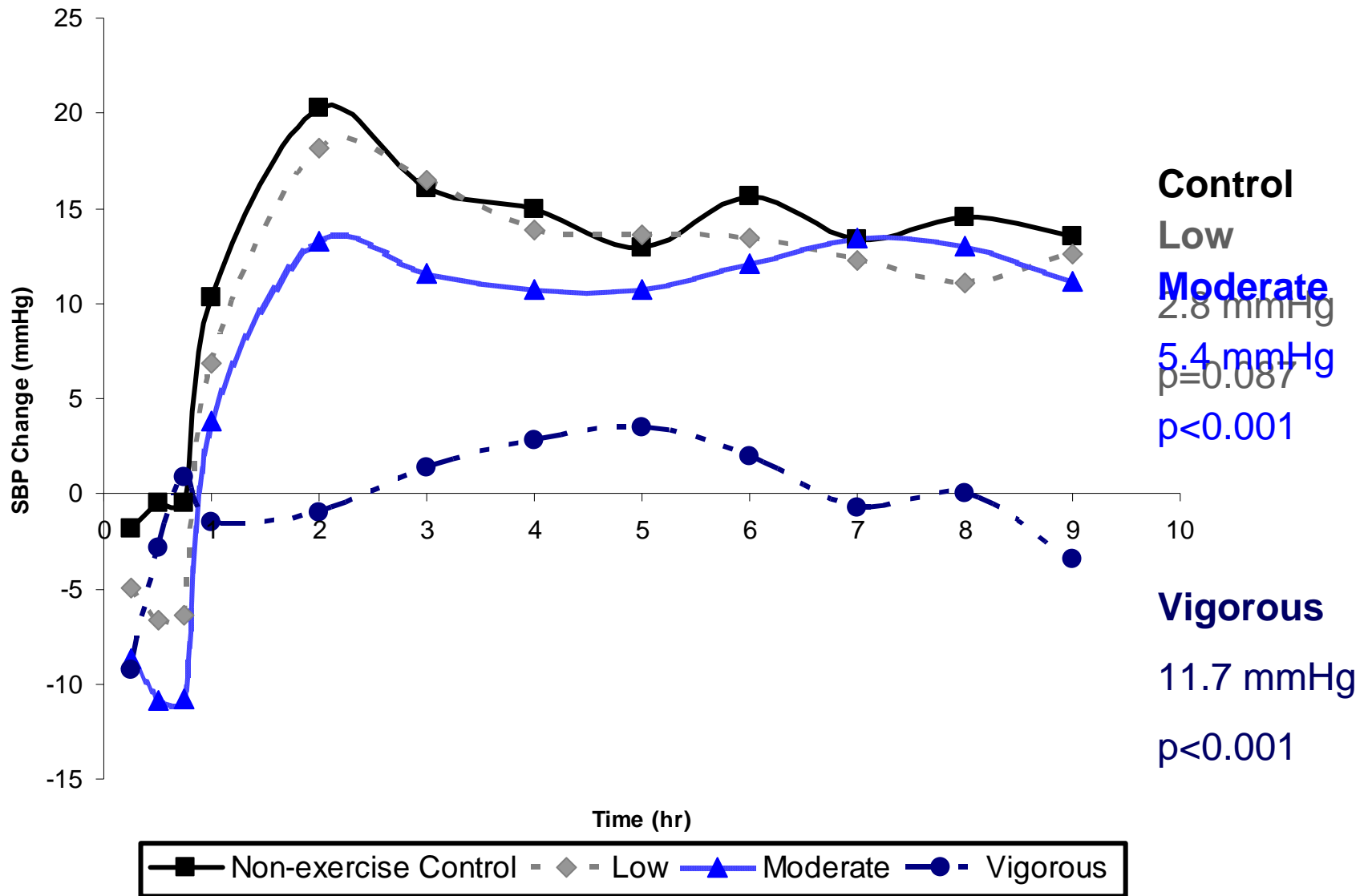
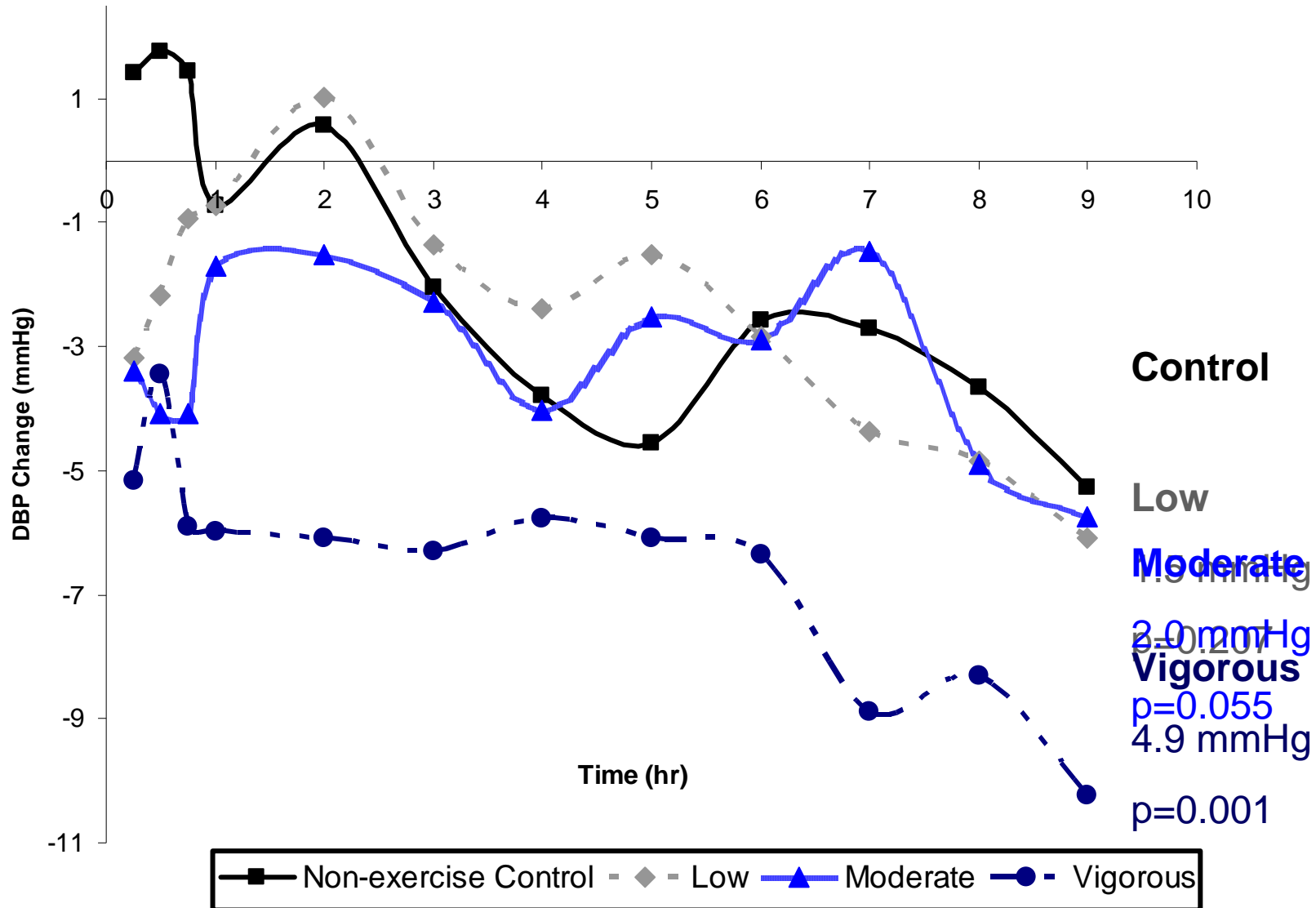
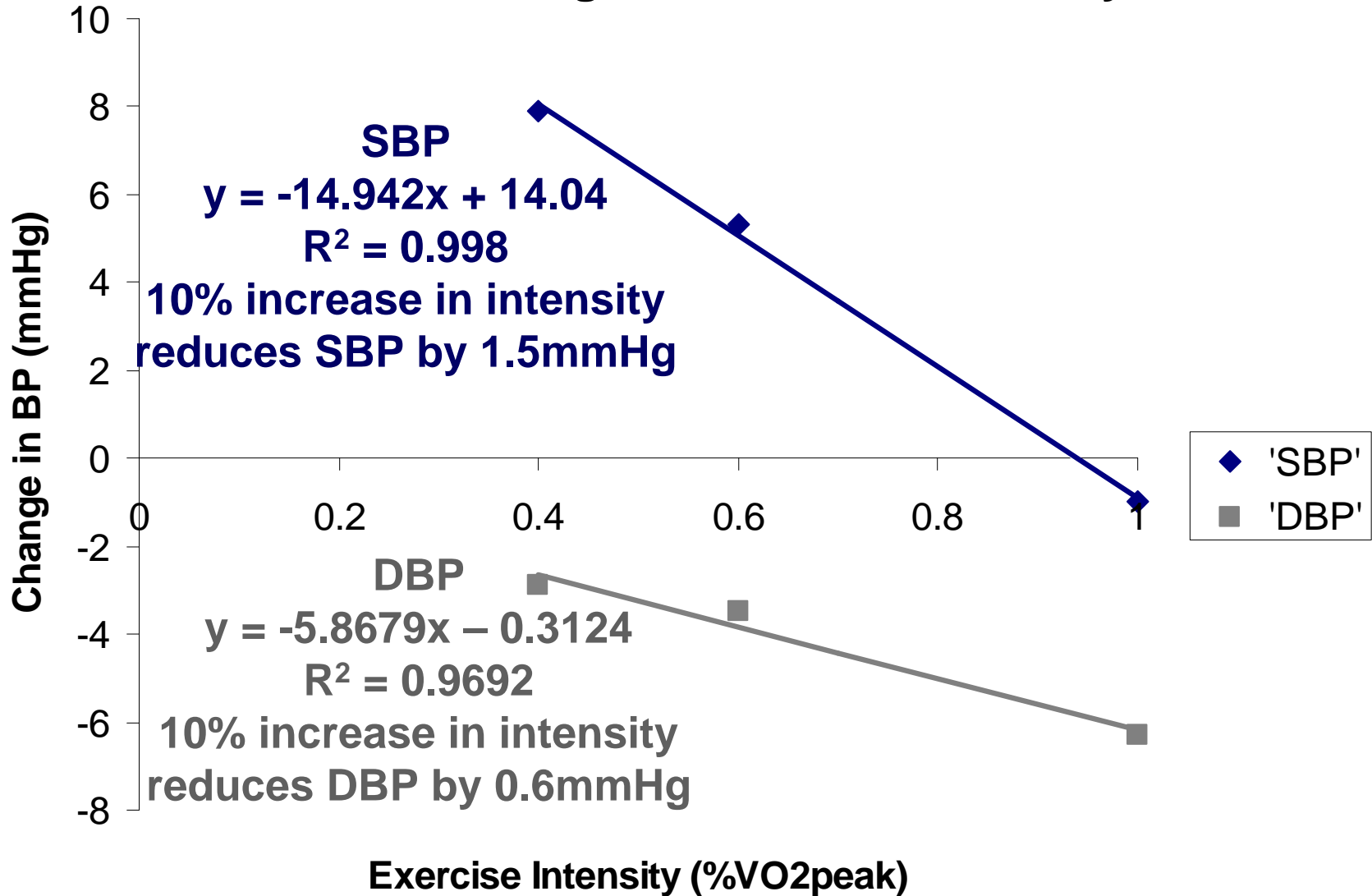


Figure 1b Mean Change in Awake DBP from Baseline over 9 hr



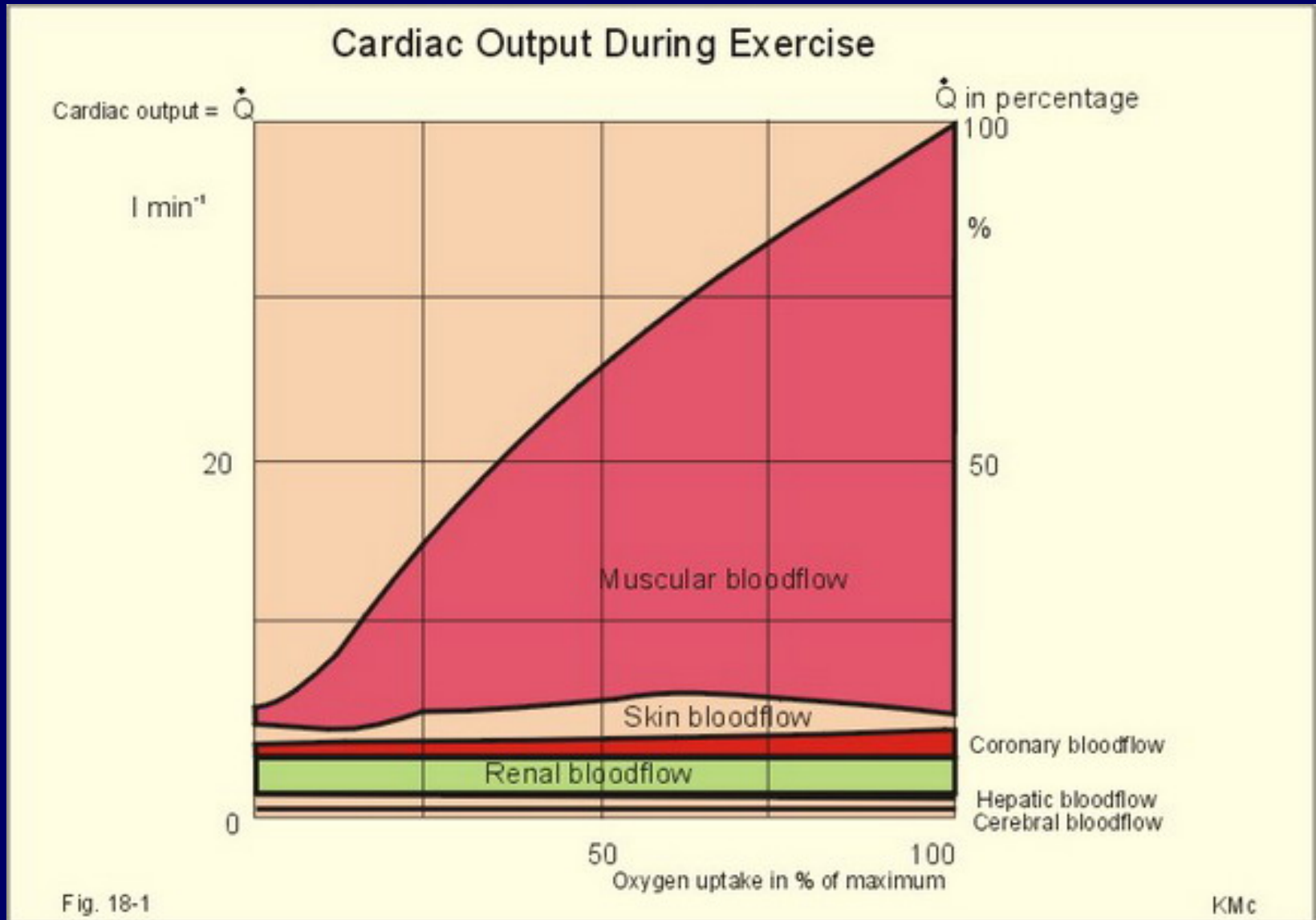
SBP/DBP Change vs. Exercise Intensity



Discussion

- All exercise intensities lowered blood pressure compared to control.
- Influence of exercise intensity on PEH occurred in dose response fashion.
 - Vigorous>Moderate>Low
 - 10% increase in exercise intensity reduced SBP by 1.5 mmHg and DBP by 0.6 mmHg

Discussion



Discussion



- Clinicians need to weigh the BP lowering benefits of vigorous exercise versus the potential of adverse effects with patients predisposed to cardiovascular disease.

Acknowledgements

HFRL at the University of Connecticut



Questions?