

Does Smoking Immediately After Exercise Deteriorate Hemodynamic and Autonomic Recovery?

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INTRODUCTION

Although regular exercise reduces the risk of cardiovascular diseases, post-exercise recovery is thought to be a vulnerable phase for an increased susceptibility to sudden cardiovascular events. Cigarette smoking has been demonstrated to amplify sympathetic activation and cardiovascular stress. Paradoxically, many smokers tend to have a smoke immediately after leisure-time physical activity or exercise. We tested the hypothesis that smoking immediately after exercise would deteriorate autonomic and hemodynamic recovery following an acute bout of aerobic exercise compared with the sham smoking control.

METHODS

■ Subjects : Thirteen healthy male smokers

(age = 22±3yrs; body mass index = 25.1±3.6kg/m²)

■ Design : Randomized cross-over design

1)Cigarette Smoking Immediately after Exercise (nicotine 0.6mg)

2)Sham Smoking Immediately after Exercise (nicotine 0.0mg)

*EXERCISE : 30 min of moderate treadmill exercise (40-60% of HRR)

■ Measurements : Heart rate, Brachial and Central artery blood pressure, rate-pressure product, Carotid-femoral pulse wave velocity (PWV), Brachial artery flow-mediated dilation (FMD), Time-domain heart rate variability (HRV)

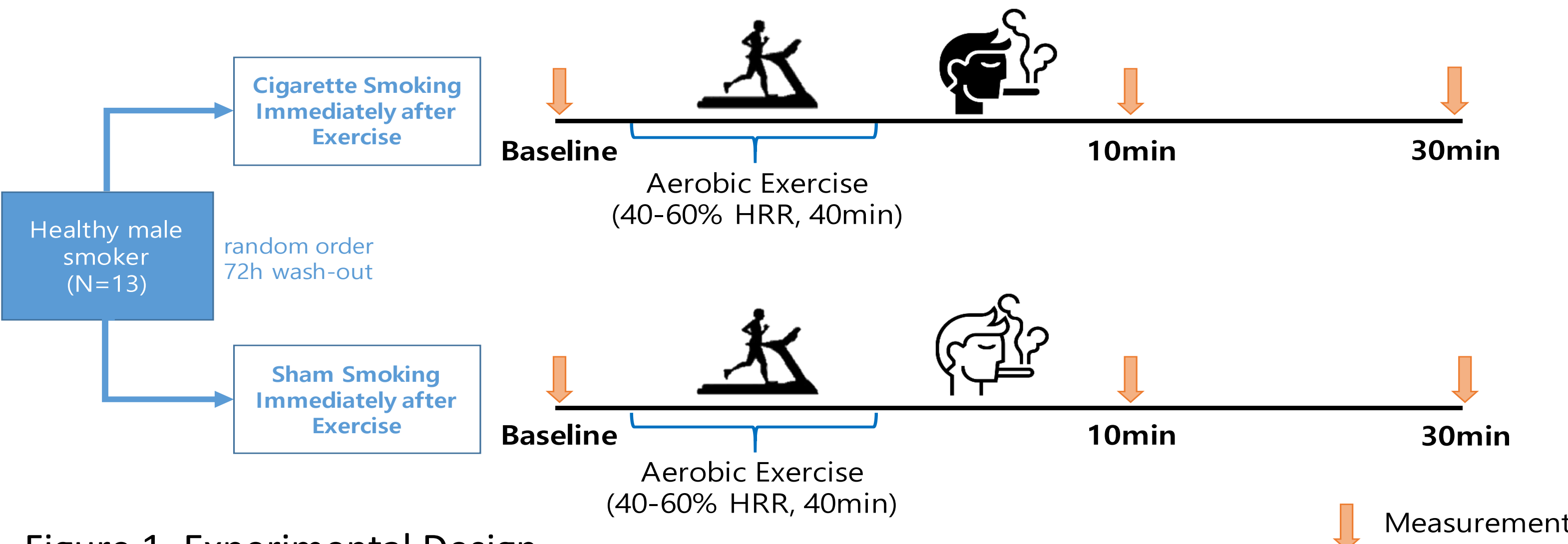


Figure 1. Experimental Design

RESULTS

Table 1. Subject characteristics

Variables	Data (Mean±SD)
Age (yrs)	22.3 ± 3.4
BMI (kg/m ²)	25.1 ± 3.6
BF (%)	19.8 ± 7.5
SBP (mmHg)	120.1 ± 8.4
DBP (mmHg)	71.9 ± 8.6
Glucose (mg/dl)	100.8 ± 6.6
TG (mg/dl)	147.1 ± 113.2
TC (mg/dl)	150.2 ± 27.0
HDL-C (mg/dl)	54.7 ± 10.5
LDL-C (mg/dl)	54.7 ± 10.5

Table 2. Effects of smoking immediately after exercise on hemodynamics

Variables	Trial	Baseline	Rec-10min	Rec-30min	p-value		
					Time	Trial	Interaction
HR (bpm)	Cigarette+EX	60.5 ± 7.5	78.8 ± 13.6	71.2±12.8	<.001	.008	<.001
	Sham+EX	61.4 ± 7.5	67.7 ± 9.1	64.5±8.4			
RPP	Cigarette+EX	7284 ± 1238	9787 ± 2036	8908±1842	<.001	<.001	<.001
	Sham+EX	7288 ± 1294	7838 ± 1503	7218±1297			
bSBP (mmHg)	Cigarette+EX	119.9 ± 9.0	123.5 ± 10.9	118.3±11.0	.001	.003	.027
	Sham+EX	118.1 ± 7.6	115.2 ± 8.2	111.3±6.7			
bDBP (mmHg)	Cigarette+EX	72.6 ± 8.2	79.3 ± 10.7	74.5±10.7	.002	.009	.001
	Sham+EX	71.8 ± 9.3	72.0 ± 8.6	69.4±9.5			
cSBP (mmHg)	Cigarette+EX	102.9 ± 7.6	107.2 ± 9.8	102.0±9.3	.001	.004	.006
	Sham+EX	101.1 ± 7.5	99.2 ± 8.3	95.7±6.5			
cDBP (mmHg)	Cigarette+EX	73.5 ± 8.4	81.6 ± 11.9	75.8±10.9	.001	.004	<.001
	Sham+EX	72.8 ± 9.2	73.2 ± 8.9	70.2±9.7			

RESULTS

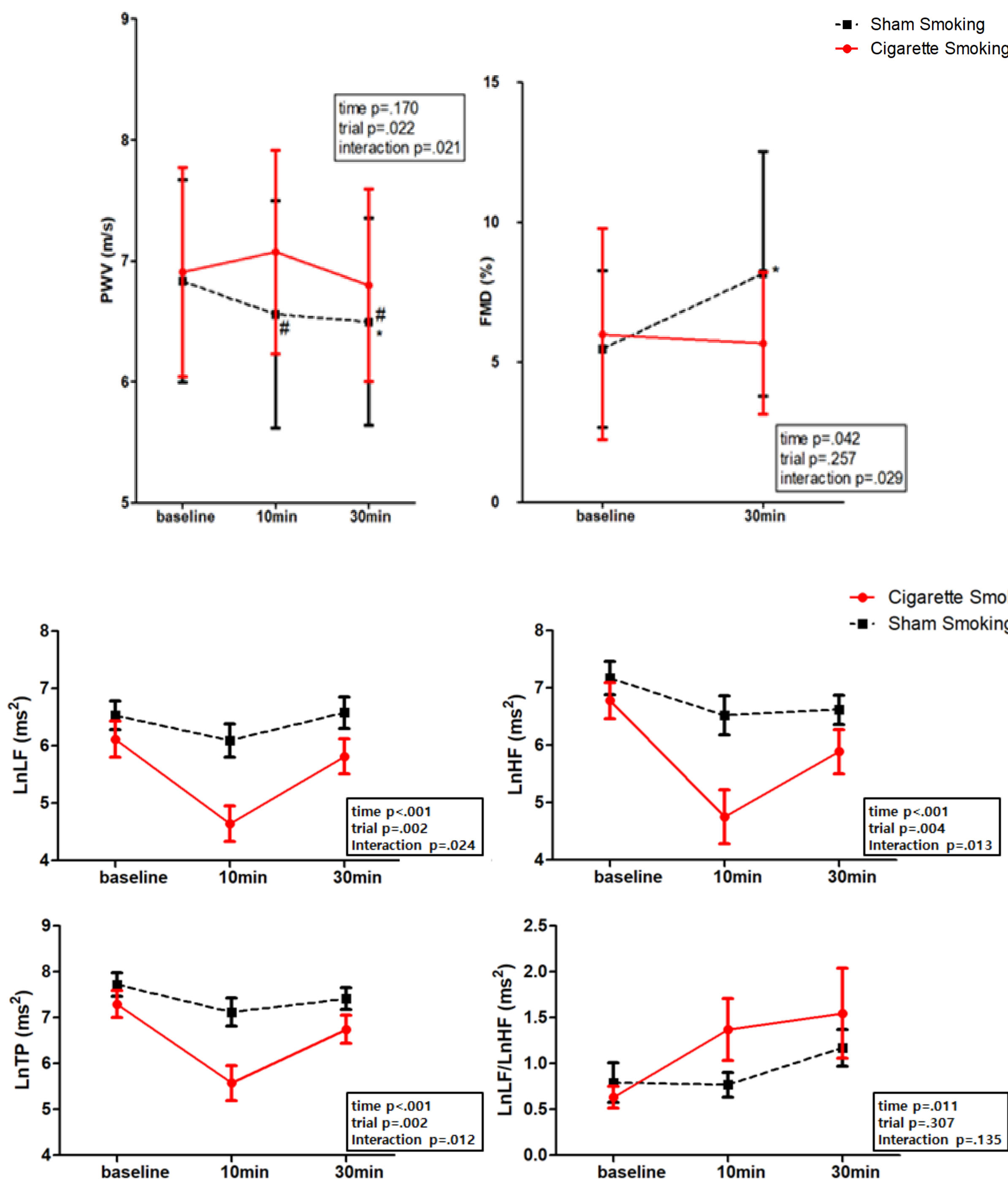


Figure 2. Effects of smoking immediately after exercise on vascular and autonomic function

CONCLUSIONS

Cigarette smoking immediately after exercise deteriorated autonomic and hemodynamic recovery in smokers, suggesting that smoking immediately after leisure-time physical activity or exercise should be avoided to reduce in the susceptibility of sudden cardiovascular events.