

## Supplementary

**Table S1** Participant's physical activity and sports involvement at the start of the study

Sports participated in	Count (n=55)	% of 30
Running	20	66.67
Cycling	8	26.67
Triathlon	7	23.33
Gym	4	13.33
Cardio	2	6.67
Trail running	2	6.67
Adventure racing	1	3.33
Body weight training	1	3.33
Boxing	1	3.33
CrossFit	1	3.33
Cycling (mountain biking)	1	3.33
Golf	1	3.33
Hiking	1	3.33
Road running	1	3.33
Soccer	1	3.33
Swimming	1	3.33
Ultimate frisbee	1	3.33
Weight	1	3.33

Participants could indicate more than one sports code.

**Table S2** Physiological responses between exercise stages

Mask group	Physiological measure	Comparing all 3 exercise stages	Pairwise comparisons (P values)		
			T1 vs. T2	T1 vs. T3	T2 vs. T3
No mask	SpO <sub>2</sub> (%) <sup>xxxx</sup>	0.3932			
	EtCO <sub>2</sub> (mmHg)	0.0032*	0.0971	0.0023*	0.4002
	RR (breaths/min)	0.7919			
	HR (beats/min)	<0.0001*	<0.0001*	<0.0001*	0.0010*
	EBT (°C)	0.2175			
	RPE (/20)	<0.0001*	0.0001*	<0.0001*	0.0004*
	RPB (/10)	0.0001*	0.0019*	<0.0001*	0.0077*
Surgical mask	SpO <sub>2</sub> (%)	0.2019			
	EtCO <sub>2</sub> (mmHg)	<0.0001*	0.0014*	<0.0001*	0.2680
	RR (breaths/min)	0.0119*	0.1280	0.0530	0.9210
	HR (beats/min)	<0.0001*	0.0003*	<0.0001*	0.0010*
	EBT (°C)	0.0729			
	RPE (/20) <sup>x</sup>	<0.0001*	<0.0001*	<0.0001*	0.0062*
	RPB (/10)	<0.0001*	0.0001*	<0.0001*	<0.0001*
Buff mask	SpO <sub>2</sub> (%)	0.4966			
	EtCO <sub>2</sub> (mmHg)	<0.0001*	<0.0001*	<0.0001*	0.1300
	RR (breaths/min)	0.0451*	0.2135	0.0085*	0.4002
	HR (beats/min)	<0.0001*	<0.0001*	<0.0001*	0.0004*
	EBT (°C)	0.4177			
	RPE (/20)	<0.0001*	<0.0001*	0.0005*	0.0036*
	RPB (/10) <sup>x</sup>	<0.0001*	0.0004*	<0.0001*	<0.0001*

\*, significantly different comparisons; <sup>xxxx</sup>, 4 missing values; <sup>x</sup>, 1 missing value. Exercise timing analysis: resting baseline (T0), 9 min (T1), 18 min (T2), and 27 min (T3).

**Table S3** Physiological responses to exercise between T0 (baseline) vs. T1, T2, and T3

Mask group	Physiological measure	Pairwise comparisons (P values)		
		T0 vs. T1	T0 vs. T2	T0 vs. T3
No mask	SpO <sub>2</sub> (%)	0.0963	0.1494	0.1557
	EtCO <sub>2</sub> (mmHg)	0.0056*	0.0007*	0.0009*
	RR (breaths/min)	0.0012*	0.0032*	0.0879
	HR (beats/min)	<0.0001*	<0.0001*	<0.0001*
	EBT (°C)	0.1047	0.1269	0.0288*
	RPE (/20)		No baseline (T0)	
	RPB (/10)	<0.0001*	<0.0001*	<0.0001*
Surgical mask	SpO <sub>2</sub> (%)	<0.0001*	<0.0001*	<0.0001*
	EtCO <sub>2</sub> (mmHg)	<0.0001*	<0.0001*	<0.0001*
	RR (breaths/min)	<0.0001*	<0.0001*	<0.0001*
	HR (beats/min)	<0.0001*	<0.0001*	<0.0001*
	EBT (°C)	<0.0001*	<0.0001*	<0.0001*
	RPE (/20) <sup>x</sup>		No baseline (T0)	
	RPB (/10)	<0.0001*	<0.0001*	<0.0001*
Buff mask	SpO <sub>2</sub> (%)	0.0020*	0.0038*	0.0023*
	EtCO <sub>2</sub> (mmHg)	0.0004*	<0.0001*	<0.0001*
	RR (breaths/min)	<0.0001*	<0.0001*	0.0001*
	HR (beats/min)	<0.0001*	<0.0001*	<0.0001*
	EBT (°C)	<0.0001*	<0.0001*	<0.0001*
	RPE (/20)		No baseline (T0)	
	RPB (/10) <sup>x</sup>	0.0003*	0.0002*	<0.0001*

\* , significantly different comparisons; <sup>x</sup> , 1 missing value. Exercise timing analysis: resting baseline (T0), 9 min (T1), 18 min (T2), and 27 min (T3).

**Table S4** Physiological responses to exercise between mask conditions

Exercise timing	Physiological measure	Comparing all three masks/groups	Pairwise comparisons (P values)		
			SM vs. BM	SM vs. NM	BM vs. NM
T0	SpO <sub>2</sub> (%) <sup>‡</sup>	0.1353			
	EtCO <sub>2</sub> (mmHg)	<0.0001*	0.9895	0.0002*	0.0003*
	RR (breaths/min)	0.1578			
	HR (beats/min)	0.1016			
	EBT (°C)	<0.0001*	0.8300	<0.0001*	<0.0001*
	RPE (/20)	No baseline (T0)			
	RPB (/10)	0.0052*	0.0770	0.9180	0.02870*
T1	SpO <sub>2</sub> (%) <sup>‡</sup>	0.0264*	0.0720	0.9640	<0.0001*
	EtCO <sub>2</sub> (mmHg)	0.0001*	0.9207	0.0003*	<0.0001*
	RR (breaths/min)	0.2725			
	HR (beats/min)	0.2300			
	EBT (°C)	<0.0001*	0.6300	<0.0001*	<0.0001*
	RPE (/20)	0.1798			
	RPB (/10)	<0.0001*	0.3645	0.0184*	0.0001*
T2	SpO <sub>2</sub> (%)	0.0247*	0.2680	0.4760	0.0180*
	EtCO <sub>2</sub> (mmHg)	<0.0001*	0.6380	0.0035*	0.0001*
	RR (breaths/min)	0.0451*	0.9210	0.0530	0.1280
	HR (beats/min)	0.2261			
	EBT (°C)	<0.0001*	0.9200	<0.0001*	<0.0001*
	RPE (/20)	0.3385			
	RPB (/10)	<0.0001*	0.5450	0.0071*	0.0001*
T3	SpO <sub>2</sub> (%)	0.1072			
	EtCO <sub>2</sub> (mmHg)	0.0012*	0.7186	0.0184*	0.0014*
	RR (breaths/min)	0.0160*	0.5560	0.1670	0.0130*
	HR (beats/min)	0.1819			
	EBT (°C)	<0.0001*	0.5300	<0.0001*	<0.0001*
	RPE (/20)	0.0200*	0.9910	0.0720	0.0970
	RPB (/10) <sup>‡</sup>	<0.0001*	0.3645	0.0029*	<0.0001*

\*, significantly different comparisons. ‡, 1 missing value. Exercise timing analysis: resting baseline (T0), 9 min (T1), 18 min (T2), and 27 min (T3).