

Supplementary Table 1. Descriptive data for aerobic exercise training parameters on CEVIS and T2 during long-duration spaceflight with traditional exercise or Sprint exercise prescription

	CEVIS		T2	
	CON	SPRINT	CON	SPRINT
Volume (min•week ⁻¹)	78±33	55±15	87±31	81±27
30 s interval				
peak HR (b•min ⁻¹)	NA	165±9	156±14	167±15
peak HR (% maximum)	NA	86.4	90.8	93.1
2 min interval				
peak HR (b•min ⁻¹)	158±11	166±11	158±9	163±25
peak HR (% maximum)	92.3	92.7	91.7	90.9
4 min interval				
peak HR (b•min ⁻¹)	156±12	164±19	156±8	169±11
peak HR (% maximum)	90.8	90.6	89.0	93.8
Continuous				
peak HR (b•min ⁻¹)	151±12	151±11	145±16	154±21
peak HR (% maximum)	88.1	84.4	85.1	86.0

Data are mean±SD. CEVIS = cycle ergometer with vibration isolation system; T2 = second generation treadmill; CON = control group that performed the ISS standard of care exercise prescription; SPRINT = experimental group that performed a high intensity/lower volume exercise prescription; HR = heart rate.

Supplementary Table 2. Descriptive data for resistance exercise training parameters during long-duration spaceflight with traditional exercise or Sprint exercise prescription

	Squat		Heel Raise		Deadlift	
	CON	SPRINT	CON	SPRINT	CON	SPRINT
Load (kg)	89.9	95.3	115.8	133.3	85.3	91.3
Repetitions•week ⁻¹	193.1	104.1	200.8	108.6	287.9	171.4
Volume load (kg•week ⁻¹)	17,014	9,613	22,946	13,871	22,917	15,074

Data are means. Volume load = sets × repetitions × load. “Squat” represents: back squat, single leg squat, and sumo squat; “heel raise” represents: heel raise and single leg heel raise; “deadlift” represents: deadlift, Romanian deadlift, and sumo deadlift. CON = control group that performed the ISS standard of care exercise prescription; SPRINT = experimental group that performed a high intensity/lower volume exercise prescription.

Supplementary Table 3. Sprint aerobic exercise prescriptions

Work time	Repetitions	Intensity (% VO_{2peak})	Rest
30 min	1	75	NA
4 min	4	90	3 min
2 min	6	70, 80, 90, 100, 90, 80	2 min
30 s	8	100	15 s

Supplementary Table 4. Sample 12-week Sprint resistance exercise prescription with exercises and load

	Day 1	Day 2	Day 3
Exercises	Squat, Heel Raise, Romanian Deadlift	Sumo Squat, Heel Raise, Deadlift	Single-leg Squat, Heel Raise, Romanian Deadlift, Sumo Deadlift
Week 1	Low	Low	Low
2	Low	Low	Low
3	Moderate	Low	High
4	High	Moderate	Low
5	Low	High	Moderate
6	Moderate	Low	High
7	High	Moderate	Low
8	Low	High	Moderate
9	Moderate	Low	High
10	High	Moderate	Low
11	Low	High	Moderate
12	Moderate	Low	High

Low load = 4 sets of 12 repetitions; Moderate load = 4 sets of 8 repetitions; High load = 4 sets of 6 repetitions. Sprint crewmembers performed resistance exercise 3 days/week. On a typical 6-month mission, crewmembers completed this 12-week cycle twice, although Weeks 1 and 2 (familiarization) were not repeated.

Supplementary Table 5. Sample 12-week resistance exercise prescription completed by control subjects with exercises and load

Exercises	Days 1,6,8	Days 2,4,9	Days 3,5,7
	Squat, Heel Raise, Deadlift, Romanian Deadlift	Sumo Squat, Heel Raise, Deadlift	Single-leg Squat, Sumo Deadlift, Romanian Deadlift
Weeks 1-3	Low	Low	Low
3-4	High	Low	Moderate
4-5	Moderate	High	Low
5-6	Low	Moderate	High
6-7	High	Low	Moderate
7-8	Moderate	High	Low
8-9	Low	Moderate	High
9-10	High	Low	Moderate
10-11	Moderate	High	Low
11-12	Low	Moderate	High
12	High	Low	Moderate

Low load = 4 sets of 12 repetitions; Moderate load = 4 sets of 8 repetitions; High load = 4 sets of 6 repetitions; heel raise was prescribed as 4 sets × 20 repetitions. Control crewmembers performed resistance exercise 6 days per week with a 9-day rotation. On a typical 6-month mission, crewmembers completed this 12-week mesocycle twice.