

SUPPLEMENTARY MATERIALS

- **Materials S1** - Types of elastic bands subdivided by colour according to the resistance offered.
- **Materials S2** - APA combined training protocol progression criteria.
- **Materials S3** – Routine laboratory parameters.
- **Materials S4** – Biomarkers and indices of inflammation.
- **Materials S5** – Anthropometric and body composition parameters.
- **Materials S6** – Blood pressure parameters and hearth rate.



Supplementary Materials S1—Types of elastic bands subdivided by colour according to the resistance offered.

Weeks	Resistance Training	Circuit Structure	Aerobic Training	Progression Focus
Weeks 1–2	Familiarization phase; focus on technique and movement control. 1–2 sets × 8–10 reps (RPE 3–4 Borg CR10). Low resistance bands.	1–2 circuits × 2 reps	Intermittent bouts to facilitate adaptation to continuous exercise. Total duration: ~10 min. Intensity: ~65% HRR.	Neuromuscular adaptation and safe exercise learning.
Weeks 3–4	Maintain technique; improve execution and control. 10 reps.	2 circuits × 2 reps	Transition toward continuous aerobic exercise. Duration: 5–10 min. Intensity maintained (~65% HRR).	Increase aerobic volume; consolidate RT technique.
Weeks 5–6	Increase repetitions to 10–12. RPE maintained.	2 circuits × 2 reps	Continuous aerobic exercise. Duration: 10–15 min.	Increase muscular endurance and training volume.

Weeks	Resistance Training	Circuit Structure	Aerobic Training	Progression Focus
Weeks 7–8	Maintain repetitions; focus on time under tension. (4–Borg CR10)	2 circuits × 2–3 reps	Increase intensity to ~70% HRR. Duration: 15 min.	Increase cardiovascular stimulus and overall workload.
Weeks 9–10	Increase resistance (higher elastic band) or reduction of band length. Reduce repetitions to 8–10.	2 circuits × 3 reps	Maintain intensity (~70% HRR).	Shift toward strength stimulus.
Weeks 11–12	Increase repetitions to 10–12 with higher resistance.	2 circuits × 3 reps	Maintain duration and intensity (~70% HRR).	Consolidation of strength and total workload.
Note: When progression in resistance band was not feasible, the duration of each progression phase was extended, allowing patients to remain longer at a given workload level before advancing, according to individual tolerance and clinical condition.				

Supplementary Materials S2—APE combined training protocol progression criteria. Abbreviations: APE, adapted physical exercise; HRR, Heart Rate Reserve; min, minutes; reps, repetitions, RPE, rate of perceived exertion.

	APE+LPD group		LPD group		P value for group/time interaction
Parameters	T ₀	T ₁	T ₀	T ₁	
Hb (g/dL)	13.3 ± 1.6	13.3 ± 1.7	13.4 ± 1.8	13.2 ± 1.9	0.2380
Lymphocytes (%)	28.4 ± 8.9	26.8 ± 8.3	26.3 ± 7.2	27.6 ± 6.1	0.1158
Monocytes (%)	7.3 ± 2.4	6.8 ± 1.7	7.0 ± 2.2	7.7 ± 1.9	0.0866
Eosinophils (%)	2.7 ± 1.8	3.2 ± 2.0	3.7 ± 1.4	3.8 ± 1.8	0.3041
Basophils (%)	0.8 ± 0.3	0.9 ± 0.4	0.6 ± 0.4	0.6 ± 0.3	0.7527
Creatinine (mg/dL)	2.3 ± 0.9	2.4 ± 1.3	2.7 ± 1.2	2.7 ± 1.6	0.4349
e-GFR* (mL/min/1.73 m ²)	30.4 ± 10.3	30.7 ± 11.5	27.8 ± 12.1	29.9 ± 15.0	0.1973
Azotemia (mg/dL)	69.4 ± 32.2	67.1 ± 34.0	82.7 ± 34.6	74.2 ± 42.9	0.3190
Sodium (mEq/L)	141.7 ± 3.0	141.7 ± 3.5	140.9 ± 2.6	139.4 ± 2.6	0.1742
Calcium (mEq/L)	9.6 ± 0.4	9.6 ± 0.3	9.4 ± 0.6	9.1 ± 0.5	0.3317
Phosphorus (mEq/L)	3.8 ± 0.9	3.6 ± 0.5	3.6 ± 0.7	3.4 ± 0.7	0.9674
HDL-cholesterol (mg/dL)	50.8 ± 15.8	49.1 ± 18.5	46.2 ± 11.3	47.1 ± 14.2	0.3187
Uricemia	5.9 ± 2.0	5.9 ± 2.2	6.00 ± 1.3	5.8 ± 1.4	0.6297
Ferritin (ng/mL)	107.2 ± 101.5	121.6 ± 91.2	107.2 ± 78.4	114.4 ± 88.6	0.7317
Transferrin (mg/dL)	241.4 ± 39.8	248.7 ± 39.6	244.0 ± 41.7	233.1 ± 72.0	0.3446

Sodiuria (mmol/24h)	118.9 ± 57.6	105.8 ± 63.5	150.0 ± 57.7	142.5 ± 71.2	0.9433
ACR (mg/g creatinine)	412.3 ± 366.7	647.2 ± 336.9	289.0 ± 227.4	126.8 ± 109.0	0.7027

Supplementary Materials S3—Routine laboratory parameters. *eGFR calculated according to CKD-EPI formula. The data are reported as mean ± standard deviation. Abbreviations: ACR, albumin-creatinine ratio; APE, adapted physical exercise; e-GFR, estimated glomerular filtration rate; Hb, hemoglobin; LPD, low-protein diet.

	APE+LPD group		LPD group		P value for group/time interaction
Parameters	T ₀	T ₁	T ₀	T ₁	
CRP (mg/dL)	1.9 ± 3.2	2.4 ± 4.4	1.0 ± 1.2	1.2 ± 2.9	0.5690
ESR (mm/h)	21.7 ± 16.8	24.3 ± 18.9	22.5 ± 14.04	20.9 ± 14.3	0.2237
Platelet/lymphocyte	116.0 ± 21.7	110.1 ± 26.7	112.0 ± 15.7	112.1 ± 20.7	0.1034
Neutrophil/lymphocyte	1.27 ± 0.34	1.43 ± 0.41	1.25 ± 0.14	1.27 ± 0.22	0.0675
Lymphocyte/monocyte	4.8 ± 1.51	5.1 ± 1.39	5.3 ± 2.11	4.9 ± 2.39	0.4327
Lymphocyte (n/mm3)	2.1 ± 0.3	2.4 ± 0.6	1.9 ± 0.6	2.3 ± 0.3	0.0875

Supplementary Materials S4—Biomarkers and indices of inflammation. The data are reported as mean ± standard deviation. Abbreviations: APE, adapted physical exercise; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; LPD, low-protein diet.

	APE+LPD group		LPD group		P value for group/time interaction
Parameters	T ₀	T ₁	T ₀	T ₁	
Rz (ohm-Ω)	462.8 ± 60.2	470.7 ± 61.5	456.8 ± 63.2	479.7 ± 61.5	0.6380
Xc (ohm-Ω)	43.9 ± 18.1	48.7 ± 9.5	44.8 ± 8.9	48.8 ± 9.5	0.8372
Phase angle (°)	5.4 ± 1.4	5.3 ± 0.6	5.6 ± 0.98	5.8 ± 1.0	0.4871
TBW (%)	56.2 ± 6.5	56.5 ± 8.1	55.8 ± 6.2	55.5 ± 6.5	0.7044
ECW (%)	48.9 ± 5.9	48.7 ± 3.4	49.0 ± 5.9	46.9 ± 4.4	0.6089
ICW (%)	51.1 ± 5.9	51.3 ± 3.4	52.4 ± 5.9	53.1 ± 4.4	0.7906
FM (%)	24.3 ± 9.0	23.7 ± 8.4	25.3 ± 9.0	24.9 ± 8.4	0.9714
FFM (%)	74.1 ± 12.9	76.3 ± 10.9	74.8 ± 9.2	75.0 ± 8.4	0.4060
BCM (%)	48.4 ± 9.3	50.5 ± 3.6	51.3 ± 6.3	52.5 ± 4.8	0.6975
BMR (Kcal/day)	1570 ± 239	1556 ± 212	1673 ± 223	1663 ± 183	0.7703

QRFT $\frac{2}{3}$ left (cm)	1.5 $\pm$ 0.3	1.5 $\pm$ 0.4	1.5 $\pm$ 0.3	1.5 $\pm$ 0.3	0.6879
QRFT $\frac{2}{3}$ right (cm)	1.5 $\pm$ 0.4	1.6 $\pm$ 0.3	1.5 $\pm$ 0.3	1.5 $\pm$ 0.3	0.3532

Supplementary Materials S5—Anthropometric and body composition parameters;. The data are reported as mean $\pm$ standard deviation. Abbreviations: APE, adapted physical exercise; BCM, body cell mass; BMR, basal metabolic rate; ECW, extra-cellular water; FFM, free fat mass; FM, fat mass; ICW, intra-cellular water; LPD, low-protein diet; QRF $\frac{2}{3}$ left, quadriceps rectus femoris thickness two-thirds left; QRFT $\frac{2}{3}$ right, quadriceps rectus femoris two-thirds right; Rz, Resistance; TBW, Total Body Water; Xc, Reactance.

	APE+LPD group		LPD group		P value for group/time interaction
Parameter	T₀	T₁	T₀	T₁	
DBP	85 $\pm$ 13	82 $\pm$ 15	81 $\pm$ 12	78 $\pm$ 10	0.6978

Supplementary Materials S6—Blood pressure parameters and hearth rate. The data are reported as mean $\pm$ standard deviation. Abbreviations: APE, adapted physical exercise; LPD, low-protein diet; DBP, diastolic blood pressure.