



Centro de Investigación Biomédica en Red
Fragilidad y Envejecimiento Saludable

Fragilidad e Intervenciones con Ejercicio de Alta Intensidad en Personas Mayores.



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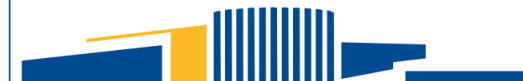
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**HOSPITAL
UNIVERSITARIO
DE TOLEDO**

ESTUDIO TOLEDO
ENVEJECIMIENTO SALUDABLE



TOLEDO STUDY FOR
HEALTHY AGING

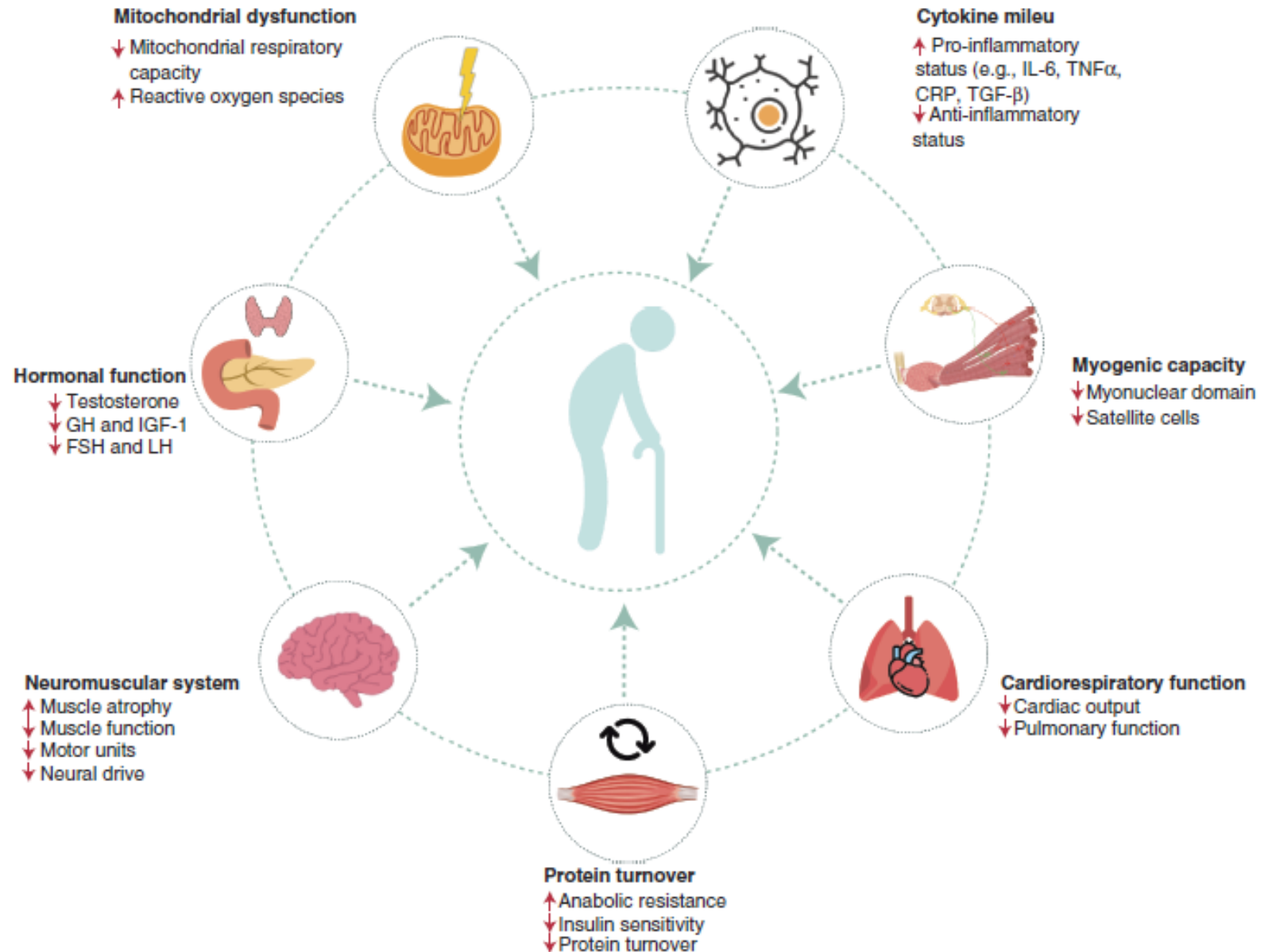


OUTLINE

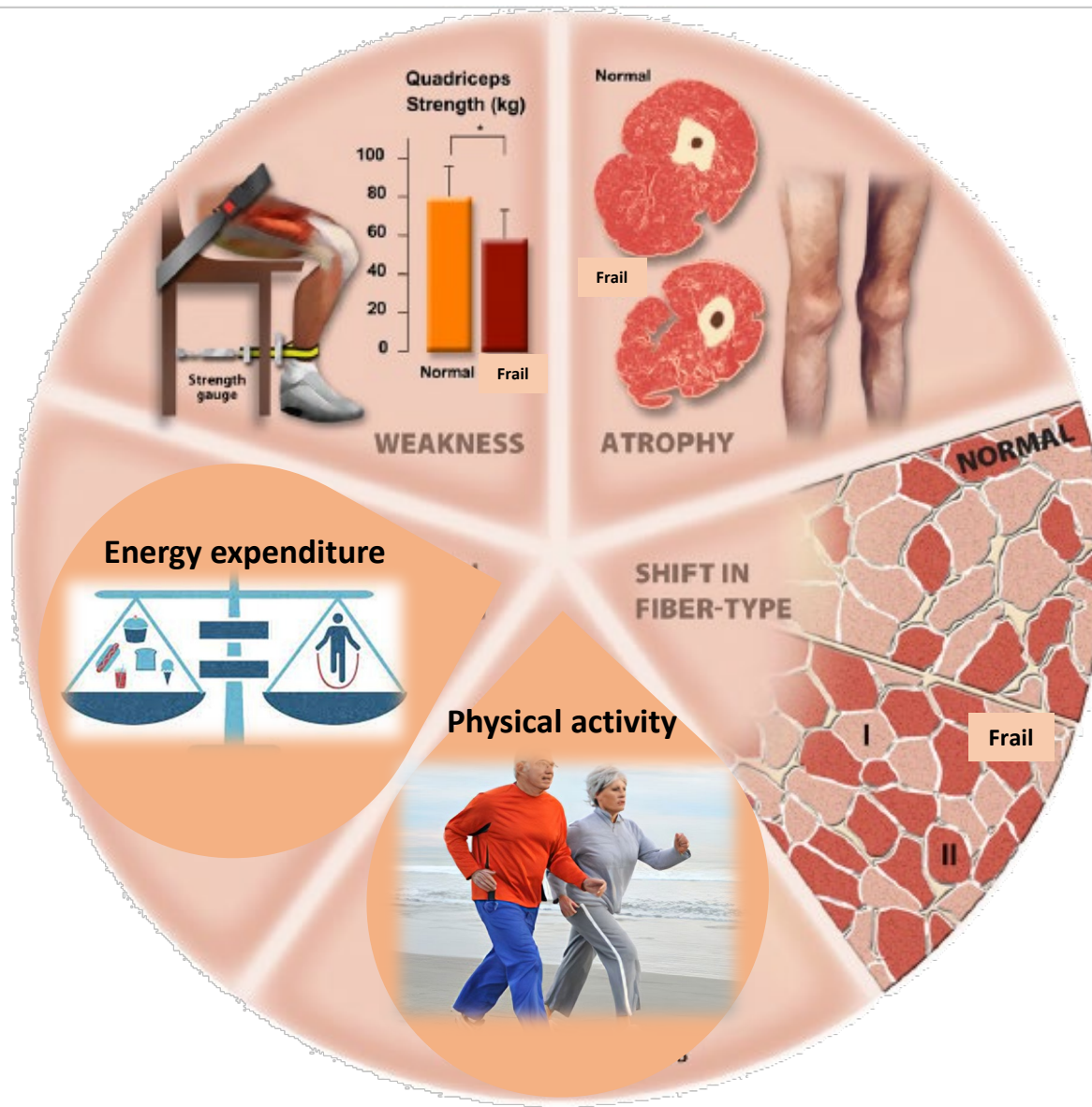
- **Fragilidad.**
- **Optimización del entrenamiento en el adulto mayor:**
 - **Unidad de Fragilidad del Hospital Virgen del Valle, programas de intervención concurrentes de alta intensidad.**

Fragilidad

*“Deterioro progresivo, relacionado con la edad, de los **sistemas fisiológicos** que provoca una disminución de las reservas de la **capacidad intrínseca**, lo que confiere una mayor **vulnerabilidad** a los factores de estrés y aumenta el riesgo de una serie de **resultados sanitarios adversos**”.*



Características físicas de la fragilidad



¿Cómo mejorar la capacidad funcional del anciano frágil?



International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines

Table 1. Exercise recommendations for optimal ageing and maintenance of functional capacities in older adults

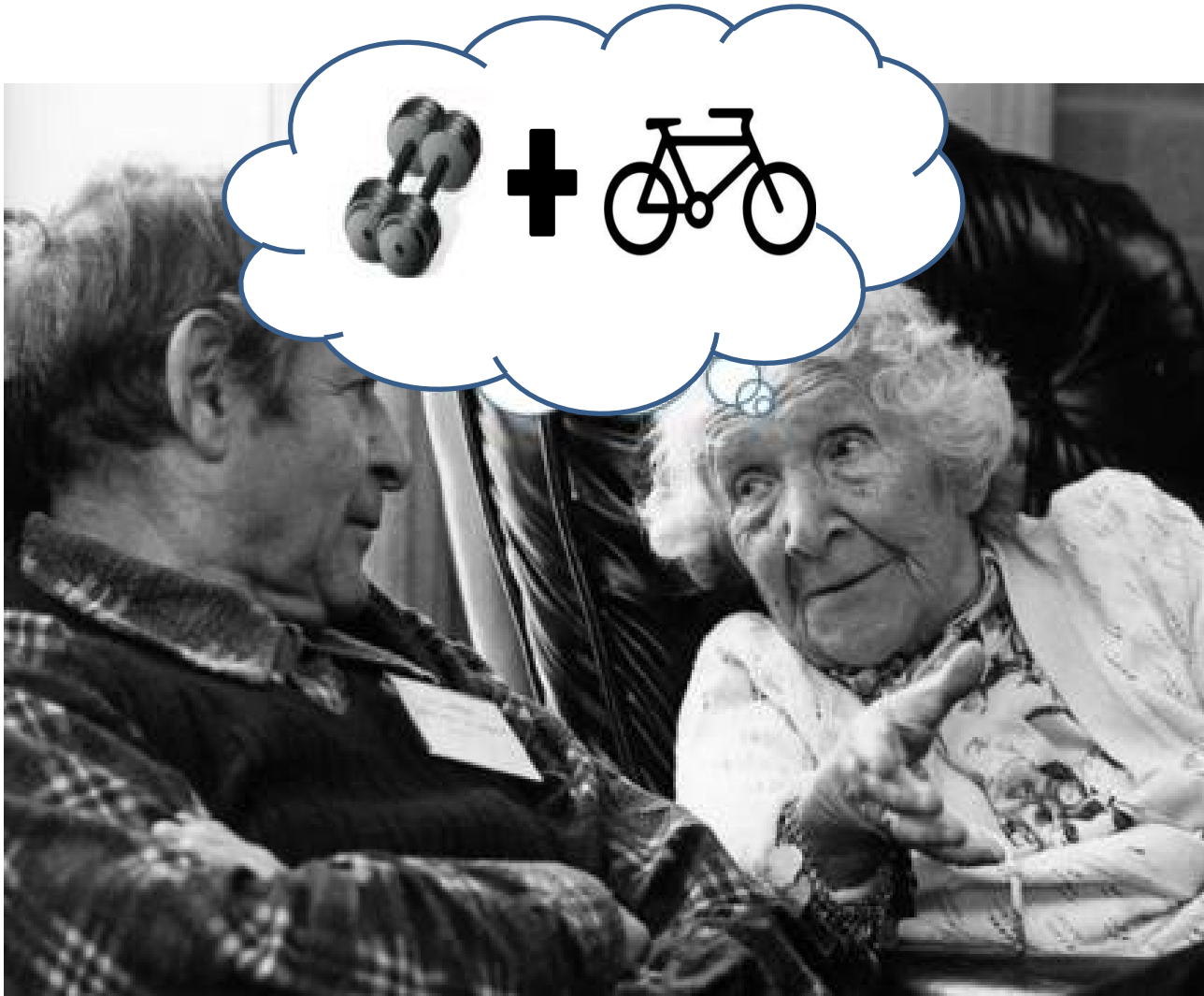
	Resistance Training	Aerobic Exercise Training	Balance Training
Frequency (days per week)	2 – 3	3 – 7	1 – 7
Volume	1–3 sets of 8–12 repetitions, 8–10 major muscle groups	20 – 60 minutes / session	1 – 2 sets of 4 – 10 different exercises emphasizing static and dynamic postures
Intensity	Start at 30-40% of 1RM and progress to heavier loads of 70–80% 1 RM (15–18 on Borg Scalea) 1-3 min rest between sets Power training at 40 – 60% of 1RM	12–14 on Borg Scale ^a (55–70% heart rate reserve or maximum exercise capacity) HIIT: >85 FCpico	Progressive difficulty as tolerated ^b Narrowing the base of support Perturbation of ground support Decrease in proprioceptive sensation Diminished or misleading visual inputs Movement of the centre of mass of the body away from the vertical or stationary position Dual tasking: adding a cognitive distractor or secondary physical task while practising a balance task

International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines

Table 4. Exercise and geriatric syndromes

Geriatric syndromes	Considerations for the prescription	Recommended exercise modality
Frailty and Sarcopenia	• Resistance and power training: 2 to 3 sessions per week, combining slower and faster (power training) muscle actions at intensities of 40 – 80 % of 1RM. • Functional exercises e.g., standing from a chair with progressive increases in loading/speed • Balance and gait exercises progressing in complexity: line walking, tandem foot standing, standing on one leg, heel-toe walking.	• Resistance training • Power training • Balance exercises • Gait retraining • Multicomponent exercise

Entrenamiento de alta intensidad



Ámbito científico



Ámbito asistencial



Ámbito domiciliario

Hipótesis



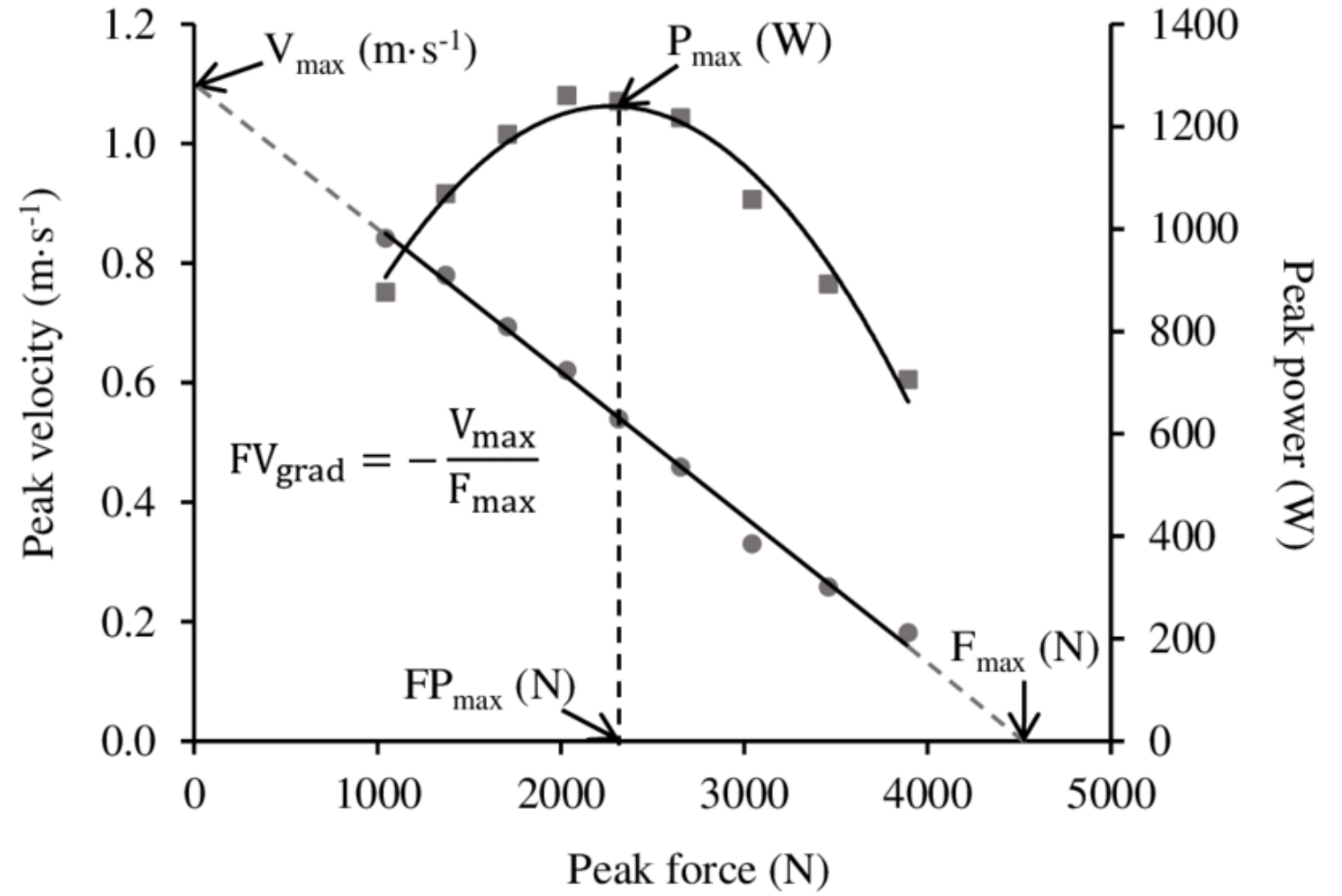
El entrenamiento de alta intensidad (potencia muscular y/o HIIT) debidamente diseñado de forma individual y supervisado puede incidir significativamente sobre la manifestación fenotípica de la fragilidad física.



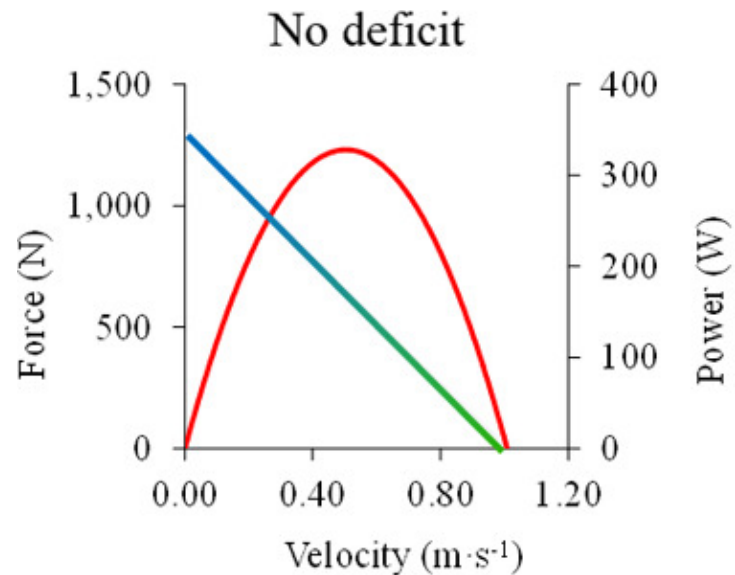
Métodos



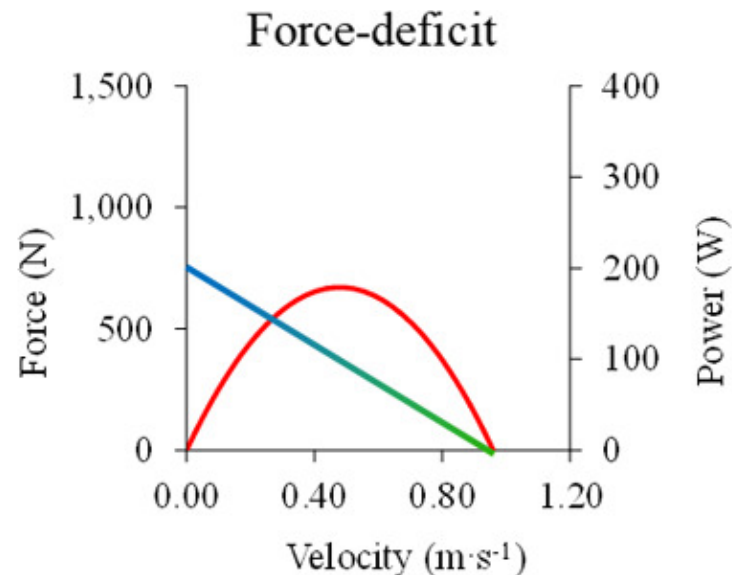
The F-V relationship



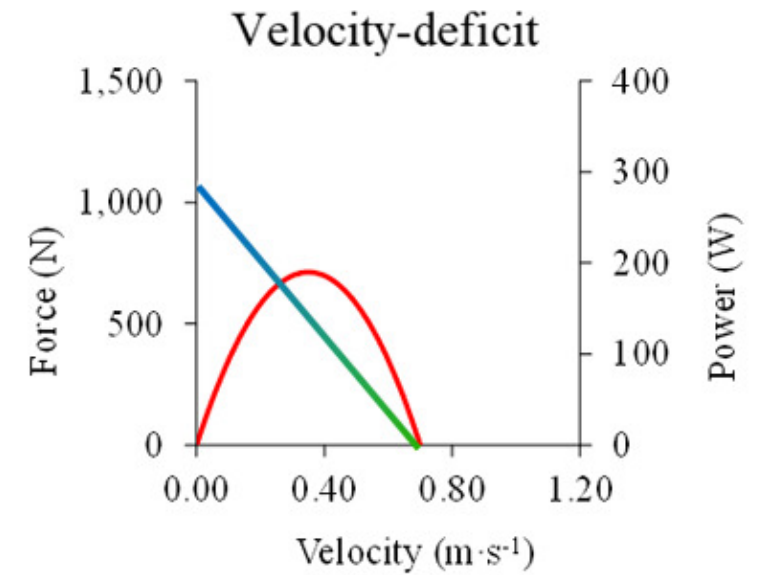
Resultados transversales: PERFILES FUERZA-VELOCIDAD, FRAGILIDAD Y FUNCION FISICA



✓ Physical function ✓ Frailty
 ✓ Cognitive function ✓ Quality of life



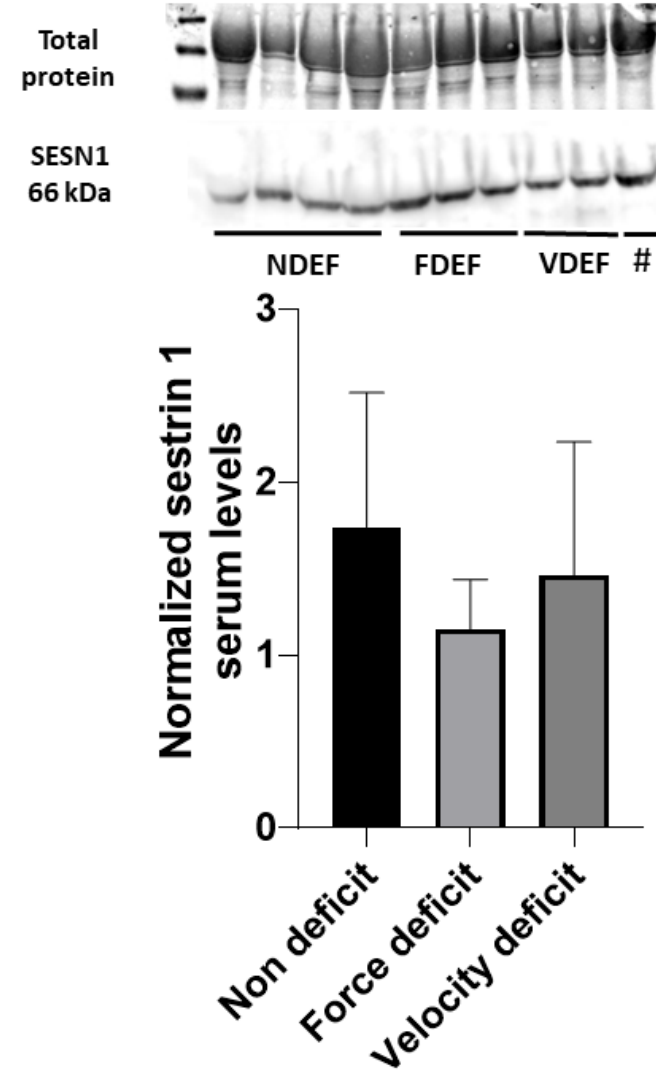
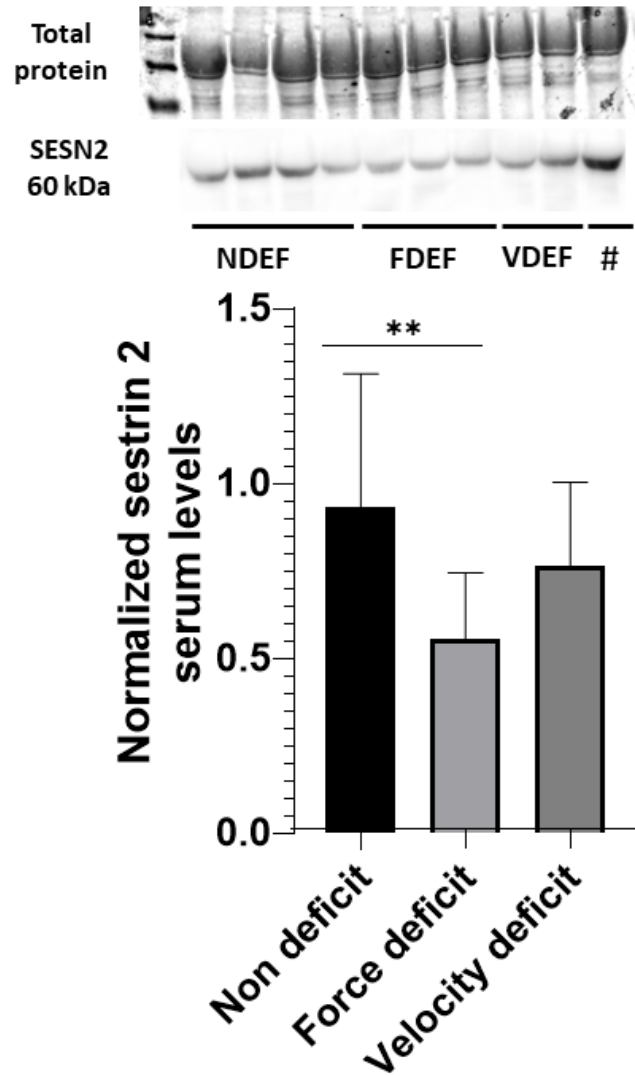
✗ Physical function ✗ Frailty
 ✗ Cognitive function ✗ Quality of life



✗ Physical function ✗ Frailty
 ✓ Cognitive function ✗ Quality of life

✓ Normal ✗ Negatively affected (association)

Resultados transversales: PERFILES FUERZA-VELOCIDAD Y SESTRINAS





Effects of concurrent exercise training on muscle dysfunction and systemic oxidative stress in older people with COPD

Julian Alcazar^{1,2}  | Jose Losa-Reyna^{1,2,3} | Carlos Rodriguez-Lopez^{1,2} | Roberto Navarro-Cruz^{1,2} | Ana Alfaro-Acha^{2,3} | Ignacio Ara^{1,2} | Francisco J. García-García^{2,3} | Luis M. Alegre^{1,2}  | Amelia Guadalupe-Grau^{2,3,4} 



12 semanas de Entrenamiento Concurrente de Alta Intensidad



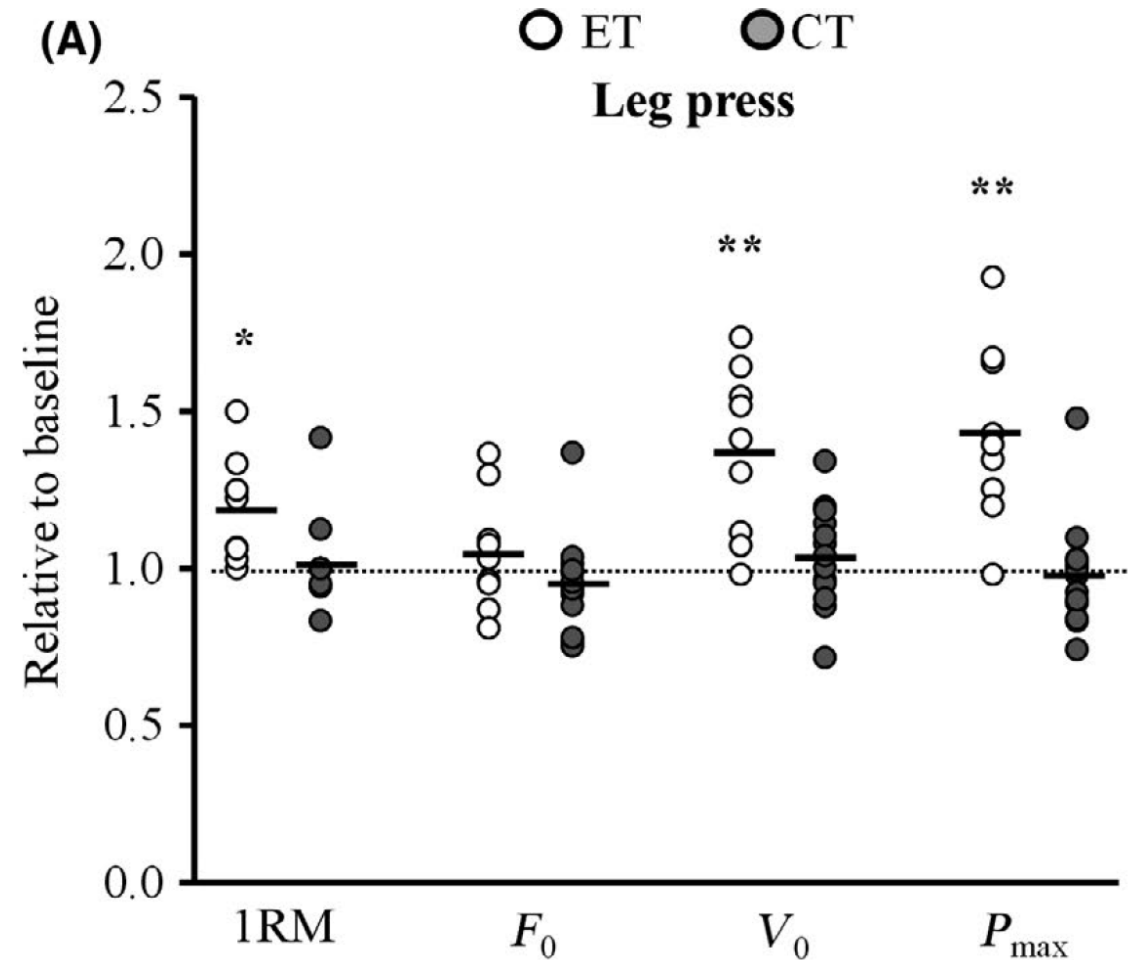
Semana	Fuerza	HIIT
1-3	2-3 x 8-12 rep 50-60% 1RM	5x[30 s (80% $W_{m\acute{a}x}$) + 90 s (40% $W_{m\acute{a}x}$)]
4-8	3 x 8 rep potencia máxima	5-7x[30s (80% $W_{m\acute{a}x}$) + 90 s (40% $W_{m\acute{a}x}$)]
9-12	3 x 8 rep potencia máxima	8-10x[30 s (80% $W_{m\acute{a}x}$) + 90 s (40% $W_{m\acute{a}x}$)]

Rep: repeticiones; % 1RM: porcentaje respecto a una repetición máxima; potencia máxima: carga correspondiente a la entrega de la máxima potencia muscular en los ejercicios de *press* de piernas y *press* de brazos; % $W_{m\acute{a}x}$: porcentaje respecto a la potencia máxima en ciclo-ergómetro.



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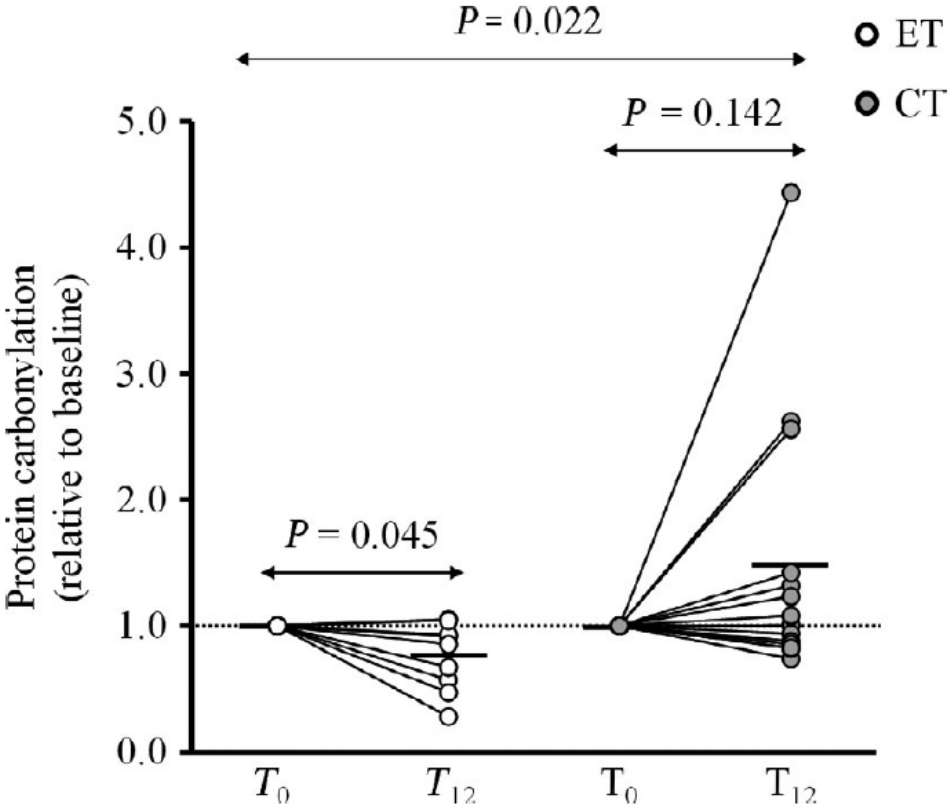


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Variable		ET group	CT group	ANOVA
		Mean ± SD	Mean ± SD	
VO _{2peak} (mL kg ⁻¹ min ⁻¹)	T ₀	17.7 ± 4.6	15.8 ± 3.8	0.023
	T ₁₂	20.2 ± 3.6*	15.8 ± 3.5	
	%Δ	14.1 ± 16.9	-0.6 ± 8.9	
W _{peak} (W)	T ₀	57.2 ± 27.3	62.3 ± 29.7	0.010
	T ₁₂	78.3 ± 26.5**	64.1 ± 32.1	
	%Δ	36.9 ± 30.8	2.9 ± 20.1	



Effect of a short multicomponent exercise intervention focused on muscle power in frail and pre frail elderly: A pilot trial

José Losa-Reyna^{a,b,c,1}, Iván Baltasar-Fernandez^{c,1}, Julian Alcazar^{a,c}, Roberto Navarro-Cruz^c, Francisco José García-García^{a,b}, Luis M. Alegre^{a,c}, Ana Alfaro-Acha^{a,b,*}

Experimental Gerontology 115 (2019) 114–121



6 semanas de Entrenamiento Concurrente de Alta Intensidad

Training protocol.

Week	Strength								Endurance				
	Legpress				Plantar flexion				Intense Interval			Active Recovery	
	Intensity		Volume		Recovery	Intensity		Volume		Recovery	Intensity		Duration
	(%F ₀)	(Sets)	(Reps)	(min)		(%BW)	(Sets)	(Reps)	(min)		(% MGS)	(Sets)	
1	30	3	15	1	100% 2 legs	3	6	1	50	1	8 min	–	–
2	40	3	12	1	100% 2 legs	3	8	1	50	1	10 min	–	–
3	50	4	8	1	100% 2 legs	3	10	1	90	10	10 s	UGS	50 s
4	50	4	8	1	100% 2 legs	3	12	1	90	6	20 s	UGS	100 s
5	50	4	8	1	100% 1 leg	3	6	1	90	6	20 s	UGS	100 s
6	60	4	8	1	100% 1 leg	3	8	1	90	6	30 s	UGS	90 s

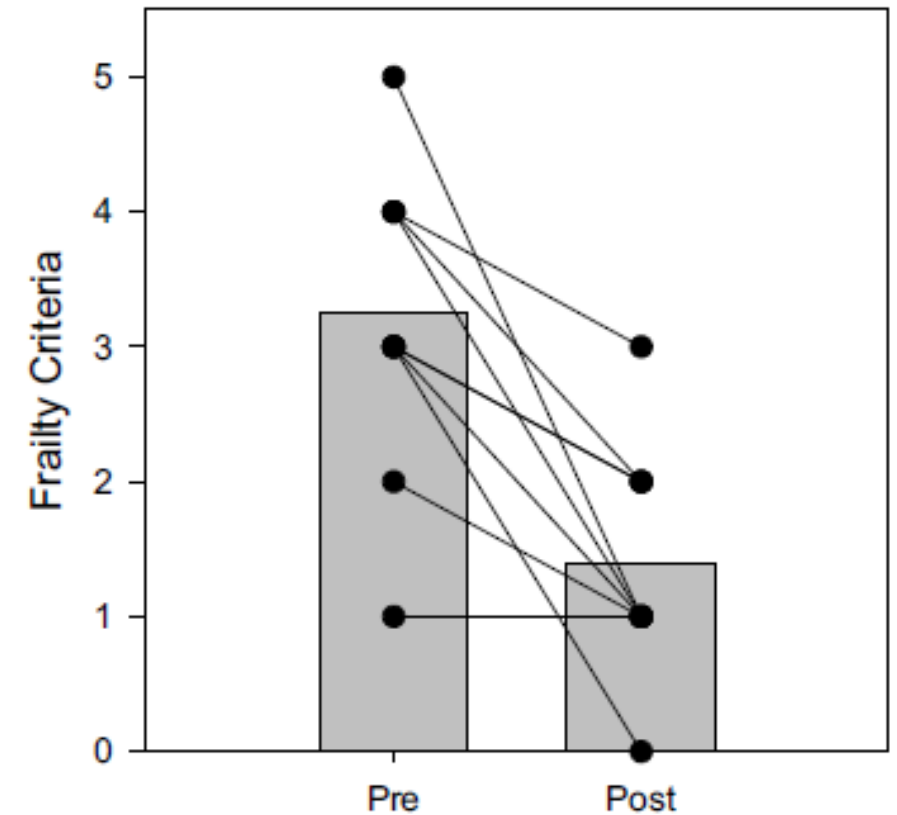
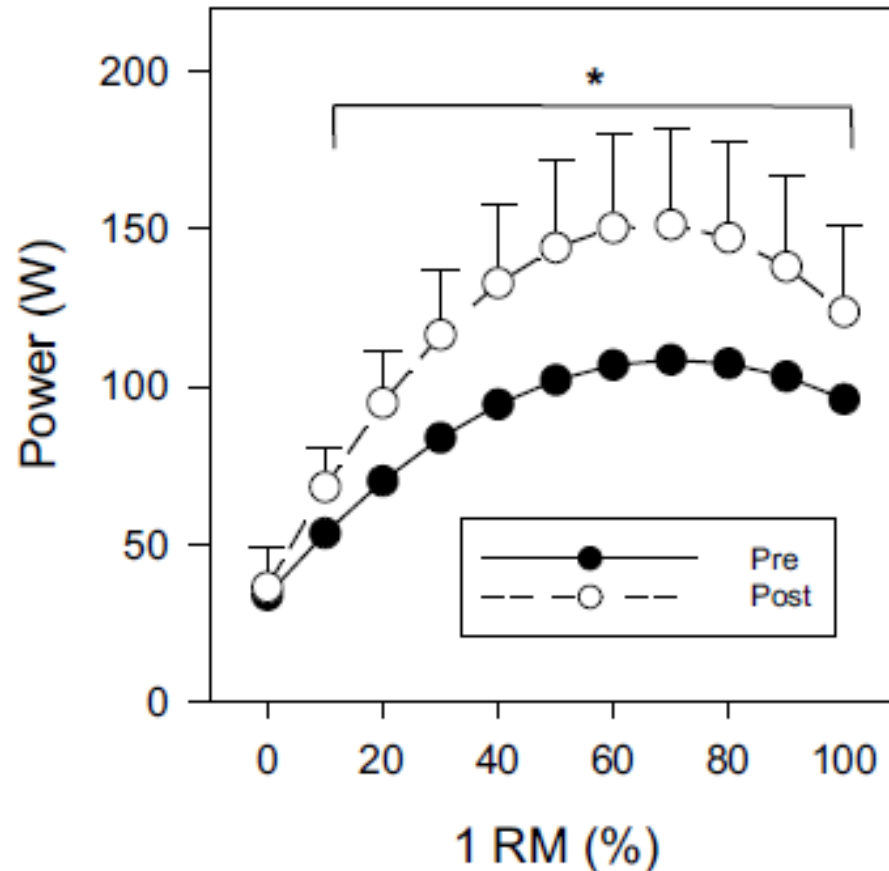
BW: body weight; F₀: theoretical maximum force; MGS: maximal gait speed; UGS: usual gait speed.



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Home-based training strategy to maintain muscle function in older adults with diabetes during COVID-19 confinement

Amelia Guadalupe-Grau^{1,2}  | Olga López-Torres¹ | Álvaro Martos-Bermúdez¹ |
Marcela González-Gross^{1,3}



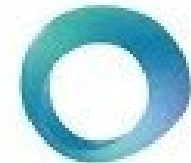
PROYECTO "DIAPOW"

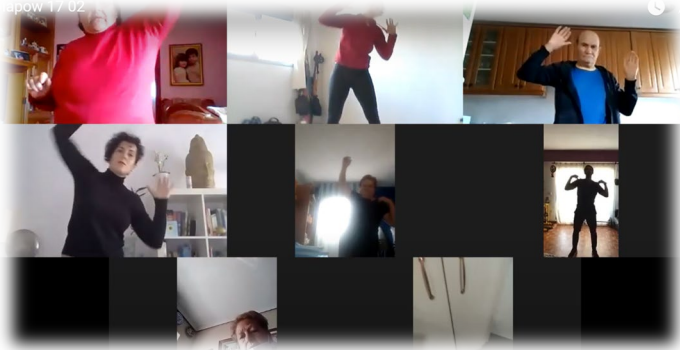
Sesión de entrenamiento en casa para personas mayores con diabetes

Responsable del proyecto: Prof. Amelia Guadalupe Grau (Grupo "Estilo de Vida" de la S.E.D.)
Educadora Física colegiada COLEF nº 54802

COLABORA: **MATRIX**

FINANCIA: **SED** | SOCIEDAD ESPAÑOLA DE DIABETES





Effects of Power Training on Physical Activity, Sitting Time, Disability, and Quality of Life in Older Patients With Type 2 Diabetes During the COVID-19 Confinement

Javier Brazo-Sayavera, Olga López-Torres, Álvaro Martos-Bermúdez, Lorena Rodríguez-García, Marcela González-Gross, and Amelia Guadalupe-Grau

Table 4 Disability Score and Health-Related Quality of Life at Baseline and After the Intervention

Variables	CG (n = 13)		EG (n = 18)		ANOVA <i>P</i> values	
	PRE	POST	PRE	POST	Time	Time × group
Barthel score	100 (0.00)	100 (0.00)	98.61 (2.87)	100 (0.00)*	.093	.093
TTO score	0.937 (0.077)	0.898 (0.114)	0.867 (0.090)**	0.888 (0.066)	.584	.107
VAS score	66.15 (17.93)	63.85 (18.50)	68.61 (11.73)	64.17 (14.78)	.329	.756

Abbreviations: ANOVA, analysis of variance; CG, control group; EG, resistance-power training group; POST, postevaluation; PRE, preevaluation; TTO, time trade-off method for health-related quality of life; VAS, visual analog scale for overall health estimation.

P* < .05—statistically significant differences with respect to preevaluation. *P* < .05—statistically significant differences between groups.

Los participantes que entrenaron reportaron menos horas de inactividad física durante el confinamiento (32% vs 58% respectivamente), además de mantener su percepción de calidad de vida.

Conclusiones y mensajes para casa

- ① El abordaje multidisciplinar de la fragilidad es clave en la consecución de un envejecimiento exitoso.
- ② Las manifestaciones fenotípicas de la fragilidad se pueden revertir, al menos en parte con el ejercicio físico.
- ③ El entrenamiento concurrente de alta intensidad, buscando altas velocidades de ejecución del movimiento es efectivo para la mejora de la funcionalidad física del adulto mayor.
- ④ El ejercicio físico debidamente controlado e individualizado se puede aplicar en diferentes ámbitos, desde el domiciliario hasta el asistencial.

Agradecimientos



POLITÉCNICA



SOCIEDAD ESPAÑOLA DE DIABETES

