



Prescripción de ejercicio en el paciente con comorbilidad. Peculiaridades a tener en cuenta en las enfermedades y síndromes geriátricos más frecuentes.

Grupo 3

Santa Marta, 25 al 28 de febrero de 2020

Contenido

- **Prescripción de ejercicio en ancianos con:**
 - Multimorbilidad
 - Diabetes mellitus
 - Fragilidad
 - Deterioro cognitivo
 - Declive funcional en hospitalización
- **Ejemplo en atención primaria**
- **Conclusiones**

Consenso

Intensidad

- Resistencia: Moderada intensidad (40-60% de FC máxima) 150 minutos a la semana, o Vigorosa intensidad (>60% de FC máxima) 75 minutos por semana.
- Fuerza: 2 a 3 series de 8 a 12 repeticiones por ejercicio, por sesión.

Frecuencia y duración

- La mayoría de los estudios incluyen 3 sesiones a la semana, una hora por sesión en promedio. Sesiones de ejercicio supervisadas.
- Al menos durante 12 semanas.

Tipo de ejercicio

- Fuerza, resistencia y equilibrio, o la combinación de estos, el entrenamiento multicomponente.
- Puede ser individualizado o grupal, por ejemplo: terapia física, Thai Chi, otros.

AGS: Realizar Evaluación Multifactorial de Riesgos → Intervención Multi-componente

Sherrington C, et al. Br J Sports Med 2017;51:1749–1757.

Sujetos excluidos

- Enfermedad cardiovascular severa o inestable
- Enfermedad pulmonar aguda o severa
- Disnea en reposo y de mínimos esfuerzos
- Tromboembolismo reciente
- Diabetes mellitus pobremente controlada
- Hipotensión ortostática sintomática
- Fractura en el último mes
- Enfermedades terminales

Casas-Herrero et al.

Effect of a multicomponent exercise programme (VIVIFRAIL) on functional capacity in frail community elders with cognitive decline: study protocol for a randomized multicentre control trial. *Trials*. 2019;20:362.



**AMERICAN COLLEGE
of SPORTS MEDICINE**

POSITION STAND

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Exercise and Physical Activity for Older Adults

This pronouncement was written for the American College of Sports Medicine by Wojtek J. Chodzko-Zajko, Ph.D., FACSM, (Co-Chair); David N. Proctor, Ph.D., FACSM, (Co-Chair); Maria A. Fiatarone Singh, M.D.; Christopher T. Minson, Ph.D., FACSM; Claudio R. Nigg, Ph.D.; George J. Salem, Ph.D., FACSM; and James S. Skinner, Ph.D., FACSM.

TABLE 3. Summary of the role of physical activity in the prevention, management, and treatment of chronic disease and disability.

Disease State	Preventive Role	Therapeutic Role	Effective Exercise Modality	Other Considerations
Arthritis	Possible, via prevention of obesity	Yes	AET RET Aquatic exercise	Low impact Sufficient volume to achieve healthy weight if obese
Cancer	Yes, AET in epidemiological studies	Yes, for QOL, wasting, lymphedema, psychological functioning, breast cancer survival	AET RET	
Chronic obstructive pulmonary disease	No	Yes, for extrapulmonary manifestations	AET RET	RET may be more tolerable in severe disease; combined effects complementary if feasible Time exercise sessions to coincide with bronchodilator medication peak Use oxygen during exercise as needed
Chronic renal failure	Possible, via prevention of diabetes and hypertension	Yes, for exercise capacity, body composition, sarcopenia, cardiovascular status, QOL, psychological function, inflammation, etc.	AET RET	Exercise reduces cardiovascular and metabolic risk factors; improves depression RET offsets myopathy of chronic renal failure
Cognitive impairment	Yes, AET in epidemiological studies	Yes	AET RET	Mechanism unknown Supervision needed for dementia
Congestive heart failure	Possible, via prevention of coronary artery disease and hypertension	Yes, for exercise capacity, survival, cardiovascular risk profile, symptoms, QOL	AET RET	RET may be more tolerable if dyspnea severely limits AET activity Cardiac cachexia targeted by RET
Coronary artery disease	Yes AET and RET now shown to be protective	Yes	AET RET	Complementary effects on exercise capacity and metabolic profile from combined exercise modalities Resistance may be more tolerable if ischemic threshold is very low because of lower HR response to training
Depression	Yes, AET in epidemiological studies	Yes	AET RET	Moderate- to high-intensity exercise more efficacious than low-intensity exercise in major depression Minor depression may respond to wider variety of exercise modalities and intensities

Effectiveness of a multimodal intervention in functionally impaired older people with type 2 diabetes mellitus

	Intervention (IG) <i>n</i> = 451	Usual care (UCG) <i>n</i> = 513	Total <i>n</i> = 964
Male, <i>n</i> (%)	222 (49.2)	269 (52.4)	491 (50.9)
Age, mean (SD) [<i>n</i>]	78.4 (5.58) [451]	77.6 (5.29) [513]	78.0 (5.44) [964]
Frail, <i>n</i> (%)	170 (33.1)	194 (43.0)	364 (37.8)
Glycated haemoglobin %, mean (SD) [<i>n</i>]	7.21 (1.23) [400]	7.33 (1.18) [485]	7.28 (1.21) [885]
Co-morbidities, <i>n</i> (%)			
Hypertension	385 (85.4)	453 (88.3)	838 (86.9)
Stroke/TIA	55 (12.2)	77 (15.0)	132 (13.7)
Cancer	49 (10.9)	78 (15.2)	127 (13.2)
Hip fracture	16 (3.5)	20 (3.9)	36 (3.7)
Osteoporosis	67 (14.9)	72 (14.0)	139 (14.4)
Parkinson's disease	15 (3.3)	15 (2.9)	30 (3.1)
Asthma/COPD	56 (12.4)	80 (15.6)	136 (14.1)
CHF	41 (9.1)	41 (8.0)	82 (8.5)
OA/RA	140 (31.0)	127 (24.8)	267 (27.7)

Result of analysis of the primary outcome (SPPB) and sensitivity analyses.

	Baseline Mean (95% CI)	1 year Mean (95% CI)	Adjusted ^a mean difference (95% CI)	<i>P</i> -value	ICC
Primary analysis					
Usual care (<i>n</i> = 381)	8.83 (8.58 to 9.09)	8.71 (8.41 to 9.01)	0.85 (0.44 to 1.26)	<0.001	0.066
Intervention (<i>n</i> = 233)	8.55 (8.22 to 8.87)	9.37 (9.04 to 9.70)			

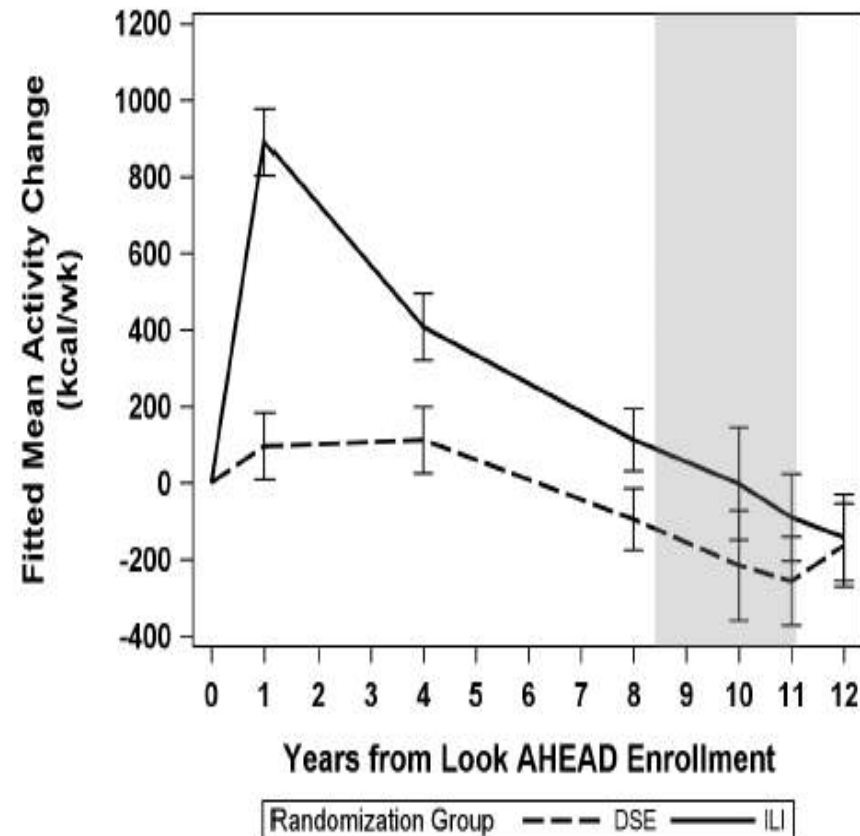
ICC, interclass correlation coefficient.

^aAdjusted for baseline SPPB, age, gender, frailty, co-morbidities, and clustering by site.

Rodríguez-Mañas et al. Journal of Cachexia, Sarcopenia and Muscle. 2019;10:721-733.

Diabetes y ejercicio a largo plazo

- Estudio aleatorizado con mejoría del desempeño físico (SPPB) hasta 11 años posteriores al programa intensivo de ejercicio en comparación con grupo control.



Houston D, Neiberg R, Miller M, Hill J, Jakicic JM, Johnson KC, Et Al . Physical Function Following a Long-Term Lifestyle Intervention Among Middle Aged and Older Adults With Type 2 Diabetes: The Look AHEAD Study. Journals of Gerontology: MEDICAL SCIENCES, 2018, Vol. 73, No. 11

Effect of a multifactorial, interdisciplinary intervention on risk factors for falls and fall rate in frail older people: a randomised controlled trial

NICOLA FAIRHALL¹, CATHERINE SHERRINGTON², STEPHEN R. LORD³, SUSAN E. KURRLE⁴, COLLEEN LANGRON¹, KERI LOCKWOOD^{1,4}, NOELINE MONAGHAN¹, CHRISTINA AGGAR⁵, IAN D. CAMERON¹

Intervención multifactorial 12 meses

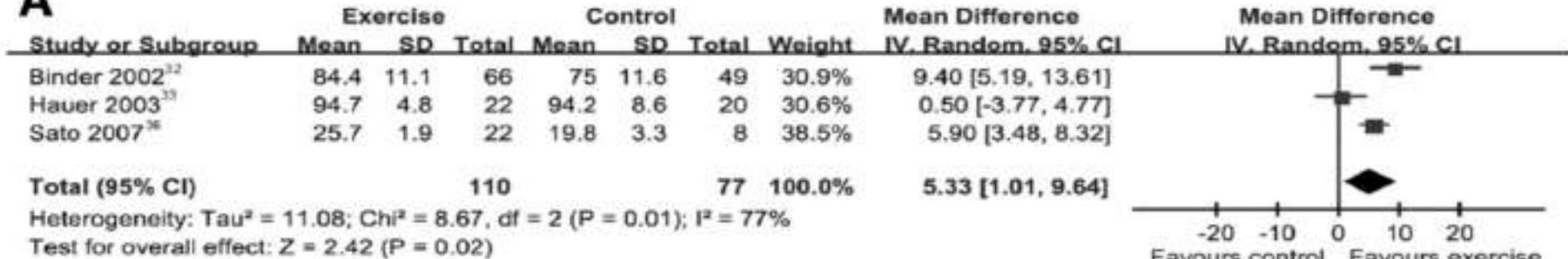
- No hubo diferencia en la tasa de caídas
- Adherencia 25-49%

	Intervention (<i>n</i> = 120)	Control (<i>n</i> = 121)
Characteristic		
Age (years)	83.4 (5.81; 71–99)	83.2 (5.91; 71–101)
Gender, <i>n</i> males (%)	39 (33)	39 (32)
Lives alone, <i>n</i> (%)	60 (50)	51 (42)
Number of frailty criteria present ^a , <i>n</i> (%)		
3	77 (64)	79 (65)
4	33 (28)	30 (25)
5	10 (8)	12 (10)
Health status		
Mini-Mental Scale score ^b (0–30)	26.6 (2.58; 19–30)	25.9 (3.14; 18–30)
Geriatric Depression Scale ^b (0–15)	4.76 (3.18; 0–14)	5.06 (3.19; 0–14)
Medical conditions ^c (0–26)	7.44 (2.90; 0–13)	7.37 (2.58; 0–12)
Medications	6.96 (3.34; 0–23)	6.85 (2.92; 0–14)

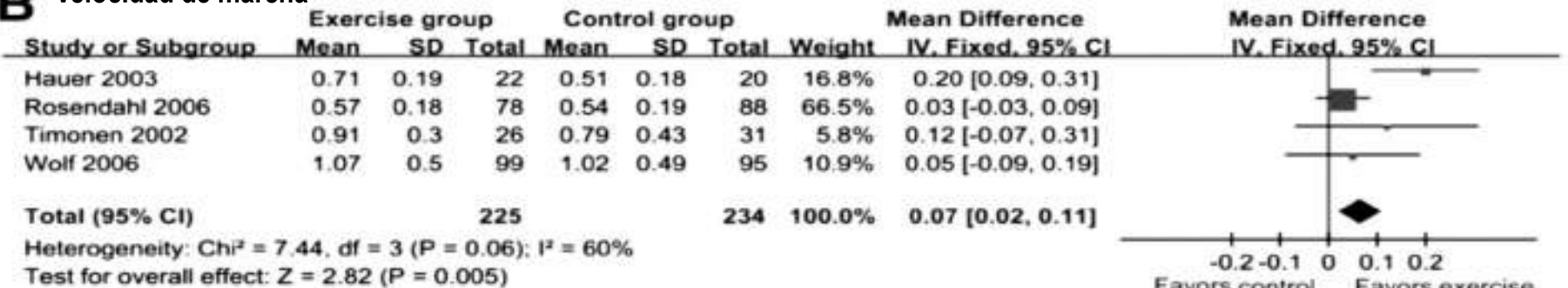
Effect of Exercise on Physical Function, Daily Living Activities, and Quality of Life in the Frail Older Adults: A Meta-Analysis

Chih-Hsuan Chou, BSc, Chueh-Lung Hwang, MS, Ying-Tai Wu, PhD

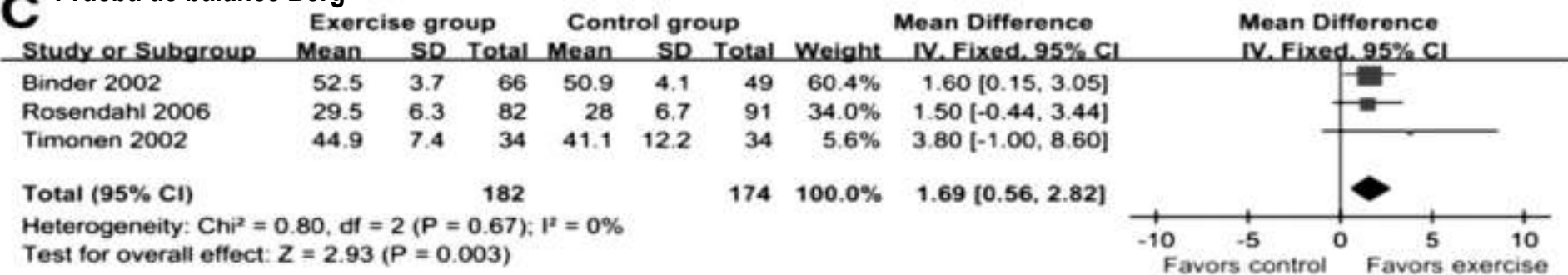
A Actividad vida diaria



B Velocidad de marcha



C Prueba de balance Berg



Programas de entrenamiento de fuerza en el anciano frágil

Características de los programas de entrenamiento de fuerza en el anciano frágil

Autores	Frecuencia semanal (número veces/semana)	Volumen (sesiones X repeticiones)	Intensidad (% de 1 RM)
Fiatatone et al. ²⁷	3	3 × 8	80% 1 RM
Hauer et al. ²⁸	3	3 × 10	70-90% 1 RM
Binder et al. ²⁹	3	1: 1-2 × 6-8 2: 3 × 8-12	1: 65% 1 RM 2: 85-100% 1 RM inicial
Sullivan et al. ³⁰	2	3 × 8	10-20 vs. 20-80% 1 RM
Hagedorn y Holm ³¹	2	3 × 10-15 RM	No mencionado, repeticiones hasta fallo
Villareal et al. ³²	3	1-3 × 8-12	65-80% 1 RM
Serra-Rexah et al. ³³	3	2-3 × 8-10	30% progresando a 70% 1 RM
Henesey et al. ³⁴	3	3 × 8	20% progresando a 90% 1 RM
Cadore et al. ¹⁴	2	1-3 × 8-10	40% progresando 60% 1 RM

Physical Training Improves Motor Performance in People with Dementia: A Randomized Controlled Trial

Klaus Hauer, PhD,^{*} Michael Schwenk, MA,^{*} Tania Zieschang, MD,^{*} Marco Essig, MD,[†] Clemens Becker, MD,[‡] and Peter Oster, MD^{*}

Characteristic				Intervention Group (n = 62)	Control Group (n = 60)	P-Value
Age, mean ± SD*				82.3 ± 6.6	82.9 ± 7.0	.68
Female, % [†]				74.2	73.3	.91
Mini-Mental State Examination score, mean ± SD*				21.7 ± 2.8	21.9 ± 3.2	.70
Education, years, median (range) [‡]				11.0 (5–19)	11.0 (7–19)	.42
Comorbidity Illness Rating Scale score, mean ± SD*				24.0 ± 3.2	23.5 ± 3.5	.48
Number of medications, mean ± SD*				7.0 ± 3.1	7.2 ± 2.9	.67
Living situation, % [†]						.29
Community dwelling				87.1	80.0	
Institutionalized				12.9	20.0	
Recent history of falls, % [†]				57.4	64.4	.43

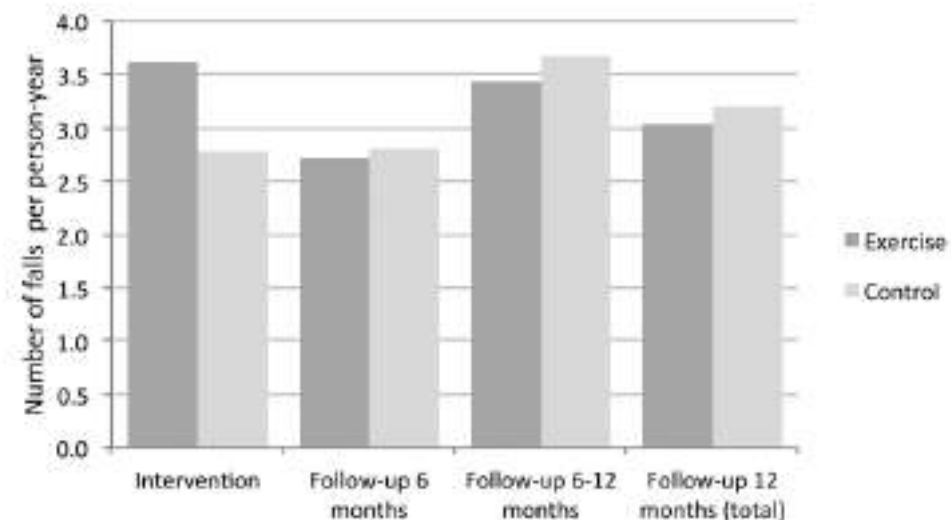
Variable	T1	T2	T3	T1–T2			T1–T3		
	IG: n = 62 CG: n = 60 Mean ± SD	IG: n = 54 CG: n = 53 Mean ± SD	IG: n = 48 CG: n = 51 Mean ± SD	% Change* Mean ± SD	P-Value [†]	Effect Size [‡]	% Change* Mean ± SD	P-Value [†]	Effect Size [‡]
Functional performance POMA total, score									
IG	20.1 ± 4.8	24.5 ± 3.7	23.1 ± 4.3	+27.7 ± 31.5	<.001	0.22	+22.2 ± 28.4	<.001	0.15
CG	19.8 ± 5.4	20.6 ± 6.0	20.2 ± 6.3	+3.4 ± 20.9			+0.8 ± 23.5		
Timed Up and Go, seconds									
IG	14.9 ± 6.7	11.2 ± 4.5	12.3 ± 4.8	−19.2 ± 18.3	.009	0.06	−11.2 ± 28.1	.009	0.07
CG	17.90 ± 16.0	17.5 ± 17.3	17.0 ± 14.2	2.3 ± 63.6			−1.4 ± 26.3		
Walking speed, m/s									
IG	0.9 ± 0.3	1.22 ± 0.36	1.13 ± 0.36	+37.6 ± 46.0	<.001	0.28	+29.4 ± 49.6	<.001	0.15
CG	0.9 ± 0.3	0.96 ± 0.34	0.96 ± 0.31	+4.7 ± 24.6			+5.8 ± 18.2		

Original Study

The Effects of Exercise on Falls in Older People With Dementia Living in Nursing Homes: A Randomized Controlled Trial

Annika Toots PhD^{a,b,*}, Robert Wiklund PT^{a,b}, Håkan Littbrand PhD^{a,b},
Ellinor Nordin PhD^a, Peter Nordström PhD^b, Lillemor Lundin-Olsson PhD^a,
Yngve Gustafson PhD^b, Erik Rosendahl PhD^{a,b}

- **MMSE**
14.9 (DE 3.5)



IRs and IRR of Falls per Person-Year During Follow-Up in Exercise and Control Group

Group	Follow-Up 6 Mo				
	≥1 Fall n (%) [*]	Total Falls (Obs d)	IR	IRR (95% CI) [†]	P
Exercise, n = 87	45 (52)	111 (14 967)	2.7	0.9 (0.5, 1.7)	.838
Control, n = 89	42 (47)	113 (14 746)	2.8	1 (reference)	

Exercise Program for Nursing Home Residents with Alzheimer's Disease: A 1-Year Randomized, Controlled Trial

Yves Rolland, MD, PhD,^{*†‡§} Fabien Pillard, MD,[†] Adrian Klapouszczak, MD,[†]
 Emma Reynish, MD,^{*§} David Thomas, MD,[‡] Sandrine Andrieu, MD, PhD,[§]
 Daniel Rivière, MD[†] and Bruno Vellas, MD, PhD^{*§}

- Programa de ejercicio: aeróbico, fuerza, flexibilidad y balance. Una hora por la tarde 2 veces por semana, durante 1 año.
- Caídas: Grupo de ejercicio 139 vs Grupo control 136
- Fracturas: Grupo de ejercicio 5 vs Grupo control 2
- Factor de adherencia

Characteristic	Exercise Group (n = 67)	Routine Medical Care (n = 67)
Age, mean ± SD	82.8 ± 7.8	83.1 ± 7.0
Mini-Mental State Examination score, mean ± SD	9.7 ± 6.8	7.9 ± 6.4
Medication use		
Medication, n, mean ± SD [†]	5.4 ± 2.3	4.8 ± 2.1
Psychotropic, n, mean ± SD [†]	1.9 ± 1.3	1.8 ± 1.1
Acetylcholinesterase inhibitor, n (%)	18 (26.9)	14 (20.9)
Comorbidities, n (%) [§]		
1	9 (13.4)	16 (23.9)
2	21 (31.3)	15 (22.4)
≥3	26 (38.9)	12 (17.9)
Walk speed, m/s, mean ± SD	0.33 ± 0.14	0.33 ± 0.14
Get-up-and-go test score, mean ± SD	2.7 ± 0.8	2.7 ± 0.8

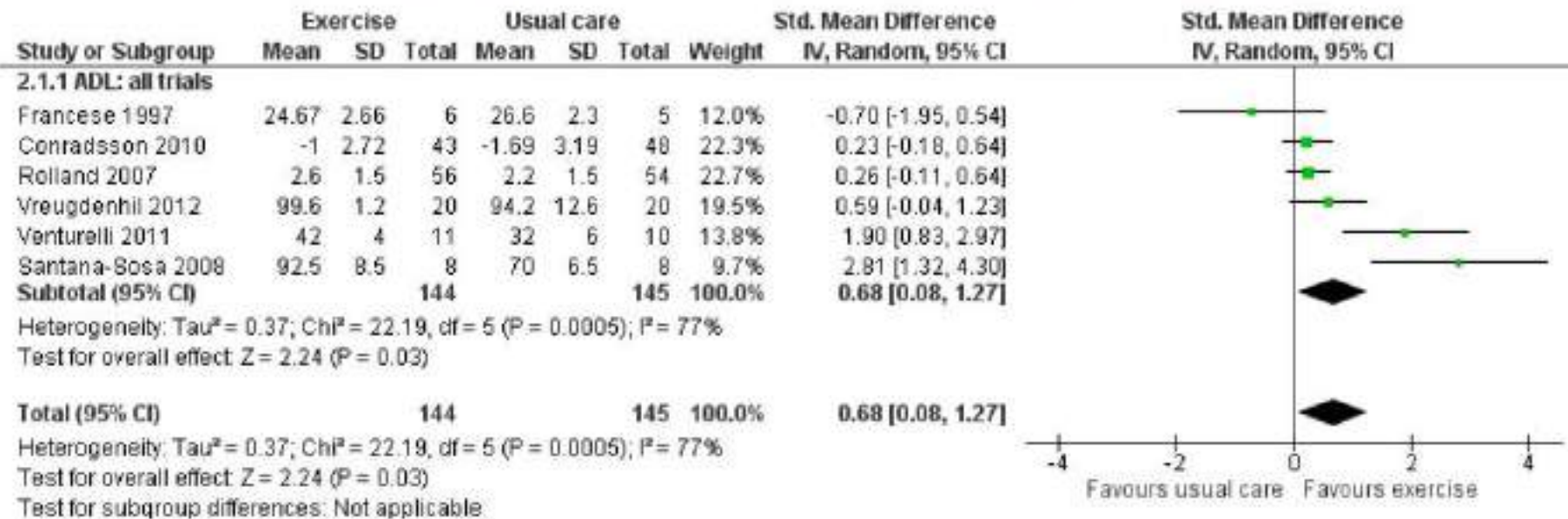
[Intervention Review]

Exercise programs for people with dementia

Dorothy Forbes¹, Scott C Forbes², Catherine M Blake³, Emily J Thiessen¹, Sean Forbes⁴

MMSE promedio de 8 a 20 puntos

Forest plot of comparison 2: Physical activity vs usual care: Activities of daily living (ADLs)





Original Study

José Antonio Serra-Rexach MD, PhD et al

Effect of a Simple Exercise Program on Hospitalization-Associated Disability in Older Patients: A Randomized Controlled Trial

Table 3
Effects of the Exercise Intervention on the Change in ADL Function, Ambulatory Capacity, and Physical Performance Capacity

Median/Mean Change	Control Group	Intervention Group	Unadjusted Difference Between Groups Mean (95% CI)	Adjusted Difference* Between Groups Mean (95% CI)
ADL function (Katz index)				
From baseline to discharge, mean (SD)	-1.26 (1.72) [†]	-1.03 (1.96) [†]	0.23 (-0.22, 0.68) <i>P</i> = .316	0.03 (-0.40, 0.45) <i>P</i> = .905
From admission to discharge, mean (SD)	0.17 (1.61)	0.73 (1.52) [†]	0.56 (0.18, 0.94) <i>P</i> = .004	0.32 (-0.04, 0.68) <i>P</i> = .083
From baseline to 3 mo postdischarge, mean (SD)	-1.31 (1.86) [†]	-0.85 (1.92) [†]	0.46 (-0.05, 0.96) <i>P</i> = .074	0.27 (-0.21, 0.76) <i>P</i> = .265
From admission to 3 mo postdischarge, mean (SD)	0.17 (2.03)	0.88 (1.89) [†]	0.71 (0.19, 1.23) <i>P</i> = .007	0.39 (-0.09, 0.87) <i>P</i> = .114
FAC				
From baseline to discharge, median (IQR)	0 (2)	0 (1)	0.04 (-0.23, 0.31) <i>P</i> = .556	-
From admission to discharge, median (IQR)	0 (1)	0 (1)	0.11 (-0.16, 0.39) <i>P</i> = .153	-
From baseline to 3 mo postdischarge, median (IQR)	0 (1)	0 (1)	-0.09 (-0.44, 0.27) <i>P</i> = .130	-
From admission to 3 mo postdischarge, median (IQR)	0 (2)	0 (1)	-0.03 (-0.46, 0.41) <i>P</i> = .558	-
SPPB				
From admission to discharge, mean (SD)	0.30 (2.17)	0.38 (1.75) [†]	0.09 (-0.40, 0.57) <i>P</i> = .732	-0.06 (-0.53, 0.41) <i>P</i> = .796

Significant *P* values are in bold.

Exercise for acutely hospitalised older medical patients (Review)

de Morton N, Keating JL, Jeffs K



Conclusión:

Existen evidencia en pacientes ancianos hospitalizados por enfermedad médica aguda que la intervención interdisciplinaria que incluye al ejercicio puede aumentar la proporción de pacientes que fueron dados de alta al domicilio y reduce la duración y el costo de la estancia hospitalaria.

Tabla 1. Características generales de la población del estudio (n= 523)

Variables	Número (%), o Promedio \pm DE
Edad	68.26 \pm 10.53
Grupos de edad	
<65	194 (37.1)
65-74	177 (33.8)
\geq 75	152 (29.1)
Genero	
Mujeres	466 (89.1)
Hombres	57 (10.9)
Enfermedades crónicas	
Hipertensión	467 (89.3)
Diabetes	185 (35.7)
EPOC	43 (8.2)
Artritis	28 (5.3)
Comorbilidad	
0	34 (6.5)
1	280 (53.4)
2	188 (36.0)
3	17 (3.3)
4	4 (0.8)
TFG	66.00 \pm 27.27
Albumina	4.4 \pm 0.3
Glicemia	108 \pm 36.6
Triglicéridos	147.6 \pm 74.3
Colesterol	173.8 \pm 41.0

DE= desviación estándar

**Programa de
ejercicio en
ancianos con
enfermedad
crónica en
atención primaria**

Modificación del dolor y la autopercepción de salud en el programa de actividad física

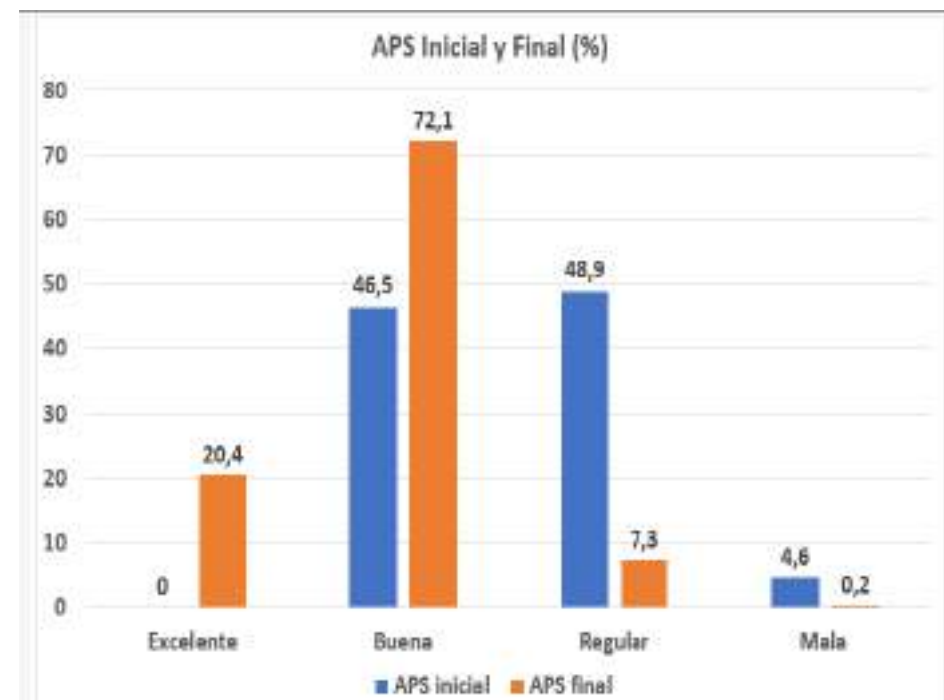
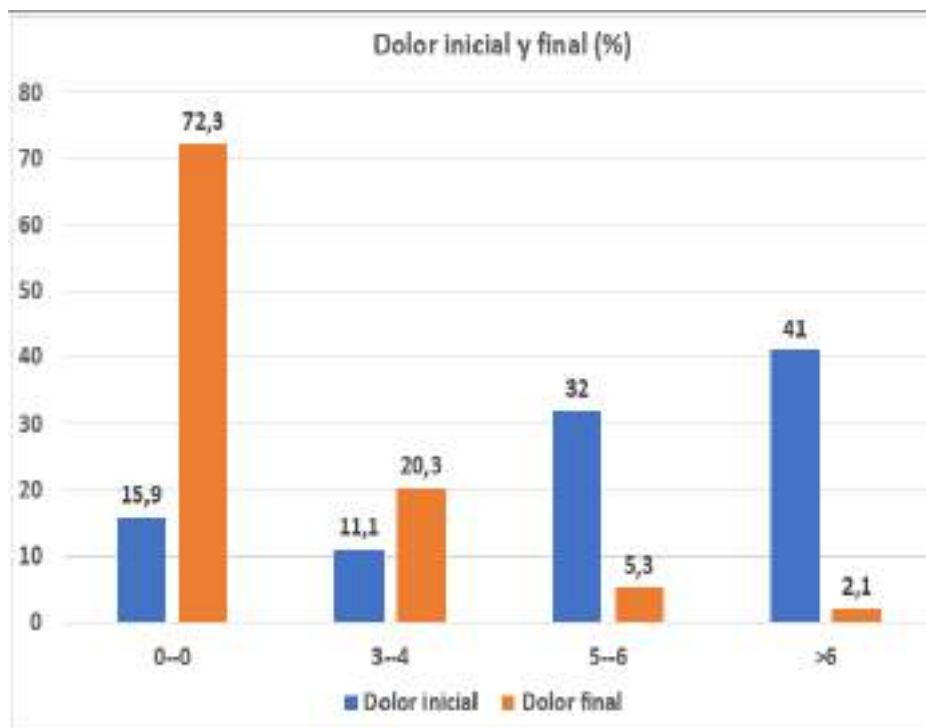
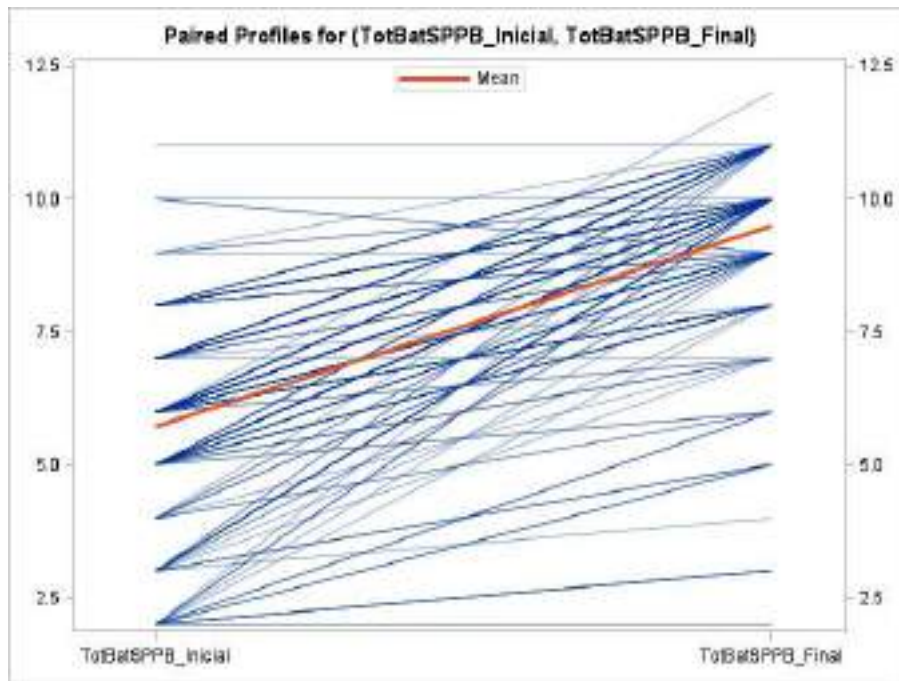


Tabla 3. Análisis bivariado variables funcionales y antropométricas, prueba antes (inicial) y después (final) (n= 523) del programa de actividad física

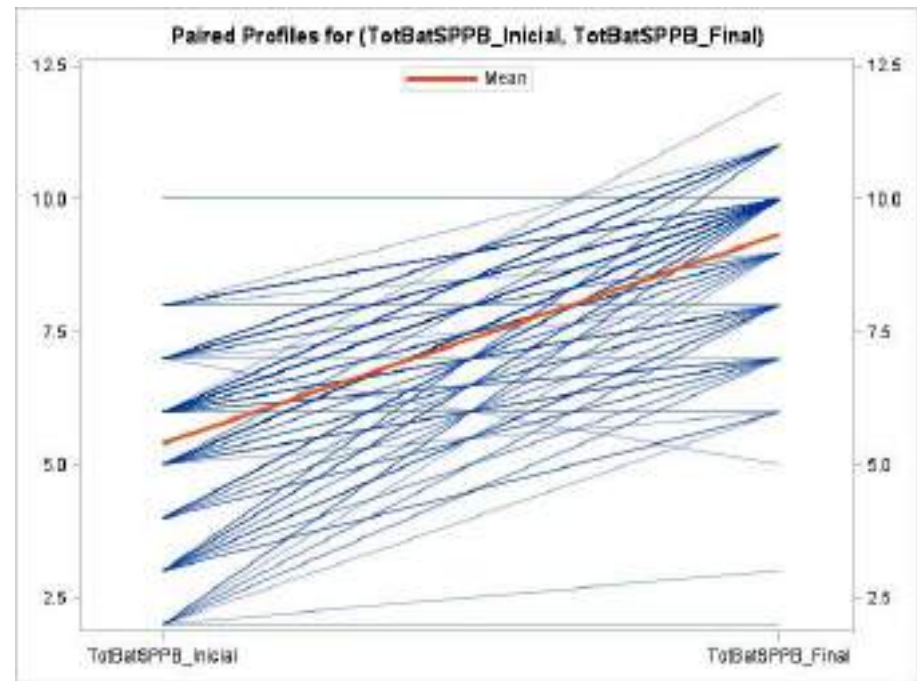
Variables	Numero (%), o Promedio ± DE	Diferencia promedio	Valor p
Escala de BARTHEL inicial	97.28 ± 7.16		
Escala de BARTHEL final	97.81 ± 6.57	0.53	0.0019 *
Fuerza de agarre inicial	15.26 ± 6.47		
Fuerza de agarre final	19.06 ± 6.37	3.79	<.0001 *
Escala SPPB			
Prueba de silla inicial	2.52 ± 1.16		
Prueba de silla final	3.79 ± 0.75	1.27	<.0001 *
Posición tándem inicial	0.28 ± 0.58		
Posición tándem final	1.67 ± 0.72	1.39	<.0001 *
Posición semitándem inicial	0.70 ± 0.46		
Posición semitándem final	0.98 ± 0.14	0.28	<.0001 *
Posición pies paralelos inicial	0.98 ± 0.15		
Posición pies paralelos final	1.00 ± 0.06	0.02	0.0038 *
Velocidad de marcha inicial	1.06 ± 0.29		
Velocidad de marcha final	1.91 ± 0.65	0.85	<.0001 *
Puntaje SPPB inicial	5.53 ± 1.68		
Puntaje SPPB final	9.33 ± 1.78	3.80	<.0001 *
Antropometría			
Perímetro abdominal inicial	93.74 ± 12.86		
Perímetro abdominal final	87.45 ± 12.57	6.28	<.0001 *
Peso inicial	66.60 ± 14.93		
Peso final	66.79 ± 14.71	0.19	0.0389 *
Índice de masa corporal inicial	27.34 ± 5.53		
Índice de masa corporal final	27.44 ± 5.48	0.09	0.0471 *
Perímetro de pantorrilla inicial	34.44 ± 4.14		
Perímetro de pantorrilla final	34.98 ± 5.02	0.54	0.0014 *

Nota: DE= desviación estándar; Ninguno escogió APS muy mala; * T-test pareado para obtener el valor; ** McNemar test para obtener el valor p; comorbilidad es sumando HTA, DM, EPOC, y artritis

Modificación en la escala SPPB según comorbilidad



Comorbilidad 0-1 (n=308); paired t-test
diferencia promedio 3.73; $p < .0001$



Comorbilidad ≥ 2 (n=204) ; paired t-test
diferencia promedio 3.93; $p < .0001$

Conclusiones

- La multimorbilidad no excluye a la PAM para recibir entrenamiento físico, a excepción de una enfermedad severa y/o agudizada.
- El adulto mayor con diabetes mellitus logra mejoría en pruebas de desempeño físico y reducción de caídas con ejercicio multicomponente.
- Los ancianos con fragilidad pueden beneficiarse de programas de ejercicio multicomponente, pero el beneficio es menor entre más criterios del fenotipo se cumplan.
- El efecto del ejercicio en ancianos con demencia moderada a severa es pobre, en parte debido a la baja adherencia alcanzada en los programas.
- La fragilidad y el trastorno neurocognitivo mayor parecen tener mayor peso en el beneficio de la prescripción de ejercicio en la PAM que su multimorbilidad.

Recomendaciones

- Intervención dirigida y supervisado por personal capacitado.
- Intervenciones con grupos pequeños
- Manual escrito, video o técnica en espejo según deterioro cognitivo
- Seguimiento estrecho para asegurar adherencia
- Paciente frágil iniciar con 30% de 1 RM
- Ejercicios deben estar aplicables a las actividades de vida diaria