

# An exercise and behavioral management program reduced functional dependence in Alzheimer disease

Teri L, Gibbons LE, McCurry SM, et al. Exercise plus behavioral management in patients with Alzheimer disease: a randomized controlled trial. *JAMA*. 2003;290:2015-22.

## QUESTION

In patients with Alzheimer disease, does a home-based exercise program combined with caregiver training in behavioral management techniques reduce functional dependence?

## DESIGN

Randomized (unclear allocation concealment\*), blinded (outcome assessors)\*, controlled trial with 2-year follow-up.

## SETTING

Community-based setting in the United States.

## PATIENTS

153 patients (mean age 78 y, 59% men) who met criteria for probable or possible Alzheimer disease, were community dwelling, were ambulatory, and had a caregiver who was willing to participate in training sessions. Caregivers lived with or spent  $\geq 4$  h/d with the patient. Posttreatment follow-up (3 mo) was 92%. Follow-up at 2 years was 58%.

## INTERVENTION

Patient-caregiver dyads were allocated to the Reducing Disability in Alzheimer Disease (RDAD) program ( $n = 76$ ) or routine medical care ( $n = 77$ ). Patients and caregivers in the RDAD program received 12 one-hour sessions over 3 months. Patients were given aerobic, endurance, strength, balance, and

flexibility training with the goal of  $\geq 30$  min/d of exercise. Caregivers were taught behavioral management techniques.

## MAIN OUTCOME MEASURES

Patient physical health and function assessed by the 36-item Short Form Health Survey's (SF-36) physical functioning and physical role functioning subscales, affective status assessed by the Cornell Depression Scale for Depression in Dementia, and exercise behavior.

## MAIN RESULTS

Analysis was by intention to treat. At 3 months, patients in the RDAD group showed greater improvements in physical

health and function and depression, had fewer days of restricted activity, and were more likely to exercise  $\geq 60$  min/wk than patients who received routine care (Table).

## CONCLUSION

In patients with Alzheimer disease, a home-based exercise program combined with caregiver training in behavioral management techniques reduced functional dependence.

Source of funding: National Institute on Aging.

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\*See Glossary.

## Reducing Disability in Alzheimer Disease (RDAD) program vs routine care at 3 months†

Outcomes	Mean change from baseline		Difference between groups	P value
	RDAD program	Routine care		
Physical health and function (scores on SF-36)‡	9.9	-17.2	27.1	<0.001
Depression (CDSDD)§	-0.5	0.4	-0.9	0.02
Days of restricted activity	-0.5	0.2	-0.7	<0.001

  

	Event rates		RBI (95% CI)	NNT (CI)
	RDAD program	Routine care		
Exercise $\geq 60$ min/wk	82%	63%	32% (7 to 65)	6 (3 to 20)

†Abbreviations defined in Glossary; RBI, NNT, and CI calculated from data in article.

‡SF-36 = 36-item Short Form Health Survey (scores range from 36 to 161).

§CDSDD = 19-item Cornell Depression Scale for Depression in Dementia (score  $\geq 8$  reflects depression).

## COMMENTARY

Many clinicians question the effectiveness of rehabilitation for patients with Alzheimer disease. Emphasis is often placed on introducing coping strategies, rather than active rehabilitation with the aim of improving physical function, mood, and behavior. Few good clinical trials exist on which to base clinical practice. No previous trial has been done of combined exercise and behavioral management in Alzheimer disease.

Teri and colleagues have done a high-quality study. The selection process resulted in enrollment of about 40% of eligible patients and caregivers. The exercise and caregiver interventions are complex, but are clearly described and could be replicated. Validated outcome measures were used, with blinded observers. The statistical analyses are appropriate. The study is adequately powered to detect effects of the intervention on functional outcome, but is underpowered to detect any reduction in institutionalization.

In the short term (i.e., 3 mo) good adherence to the program was found. This was associated with an increase in SF-36 and Sickness Impact Profile mobility scores, and a decrease in the Cornell

Depression Scale scores. However, only 58% of patients completed the 2-year follow-up. The longer-term benefits of this program are unclear because of large numbers of dropouts and the potential confounding that this introduces.

This study showed that it is possible to improve physical function and affect in carefully selected community-dwelling patients with Alzheimer disease by a program of intensive exercise and caregiver education delivered by an expert team of rehabilitationists. Adherence was good in the short-term, but fell off rapidly after 3 months. However, before this approach could be widely adopted, we would need more information on whether a less selected cohort of patients and relatives would adhere to the program. An economic analysis also is required because the intervention was time-consuming and might be prohibitively expensive.

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