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***Our Mission:*** Helping to prepare Iowa's health practitioners to care for our growing population of elders. *E-NEWS* is one of our methods of teaching through technology.

Each month, *E-NEWS* delivers abstracts from current multidisciplinary healthcare journal articles related to a specific geriatric topic. This month's *E-NEWS* focuses on EXERCISE FOR THE OLDER ADULT.

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## EXERCISE FOR THE OLDER ADULT

**In this issue of the *E-NEWS*, you will find abstracts for:**

- A study that investigates the impact of a multicomponent exercise program on nursing home residents.
  - A study that evaluates the effects and feasibility of an exercise intervention for individuals living with dementia in nursing homes.
  - A review that examines how exercise influences cognitive performance in mild cognitive impairment.
  - A study that tests the effects of a resistance band exercise program on depression and challenging behaviors of wheelchair-bound older adults with dementia.
  - An article that addresses the benefits of exercise in the older adult population.
  - A study that seeks to determine the effects of a 12-week marching in place and chair rise daily exercise intervention on ADL and functional mobility in frail older adults.
  - A study that explores whether leisure-time physical activity among older adults with mild cognitive impairment is associated with a decreased risk of developing dementia.
  - An article that discusses exercise prescriptions in older adults.
  - A study that analyzes the effect of low-intensity versus high-intensity resistance training on the functioning of frail older adults.
  - A study that assesses the effects of strength training on cognitive performance in older women.
  - An article that presents the results of a 3-year follow-up of a study on functional capacity and levels of physical activity in aging.
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- Arrieta H, Rezola-Pardo C, Zarrazquin I, Echeverria I, Yanguas JJ, Iturburu M, Gil SM, Rodriguez-Larrad A, Irazusta J. A multicomponent exercise program improves physical function in long-term nursing home residents: A randomized controlled trial. *Exp Gerontol*. 2018 Mar;103:94-100.

To investigate the impact of a multicomponent exercise program on anthropometry, physical function, and physical activity on older adults living in long-term nursing homes (LTNH), we conducted a randomized controlled trial involving 112 participants aged  $84.9 \pm 6.9$  years. Participants were randomly assigned to an intervention (IG) or control group (CG). The IG participated in a 3-month multicomponent exercise intervention focused on strength, balance, stretching exercises, and walking recommendations. Subjects in the CG participated in routine activities. Analyses of outcome parameters were performed in the entire sample and in two subgroups, classified according to participants' physical function score at baseline. The group-by-time interaction, favoring the IG, was significant for the entire sample and for the participants in the low physical function subgroup for the following parameters: waist circumference, 30-s chair-stand, arm-curl, 8-ft timed up-and-go, SPPB score, gait speed, and Berg scale ( $p < .05$ ). In participants with higher physical function at baseline, significant group-by-time interaction was observed in the SPPB score and Berg scale ( $p < .05$ ). When differences were analyzed within groups, the IG maintained or improved in all assessed parameters, while participants in the CG showed a marked decline. Our study showed that a multicomponent exercise program is effective for older people living in LTNH. This is especially relevant in those with lower physical function scores. The lower efficacy of the program in participants with better function might be due to the insufficient exercise demands of our intervention for more fit residents. Future studies should analyze the effects of programs with higher intensities in older people with intermediate to high physical function.



- Brett L, Traynor V, Stapley P, Meedya S. Effects and feasibility of an exercise intervention for individuals living with dementia in nursing homes: study protocol. *Int Psychogeriatr*. 2017 Sep;29(9):1565-1577.

BACKGROUND: Worldwide, there are an estimated 35.6 million individuals living with dementia. It is important that non-pharmacological therapies are utilized to help manage the symptoms of dementia, such as agitation, as they are the recommended first approach in best practice guidelines. METHODS: This protocol outlines a randomized controlled trial with a qualitative component which evaluated the effects and feasibility of a physical therapist-led physical exercise intervention on agitation of individuals living with dementia in nursing homes. Physical performance levels were considered as a secondary outcome. This evidence-based protocol consisted of a range of adaptable physical exercises that targeted strength, balance, endurance, and flexibility. To help determine the optimum parameters for this population group, the study used two intervention groups: (a) physical exercise intervention for 45 minutes once a week; (b) physical exercise intervention for 15 minutes three times a week (total time also 45 minutes per week). Both intervention groups were compared to a control group, which continued to participate in usual care only (no specific physical exercise intervention), such as basic seated exercise class, carpet bowls, and "armchair" activities. CONCLUSIONS: The physical therapist-led physical exercise intervention detailed in this protocol could be integrated into dementia care in nursing homes or other similar settings to help reduce agitation and improve physical performance.



- Cai Y, Abrahamson K. How Exercise Influences Cognitive Performance When Mild Cognitive Impairment Exists: A Literature Review. *J Psychosoc Nurs Ment Health Serv*. 2016 Jan;54(1):25-35.

Older adults who present with mild cognitive impairment (MCI) have an increased risk of developing more advanced dementia. However, no pharmacological treatment currently exists to slow the progression of or reverse MCI. The purpose of the current systematic review is to summarize evidence surrounding the impact of exercise interventions on the cognitive performance levels of community-dwelling older adults with MCI. Computerized database and ancestry search strategies located distinct intervention trials between 1990 and 2015. Results indicated that physical exercise may benefit cognitive function among older adults who have MCI, including improvements in global cognition, executive function, memory, attention, and processing speed. Physical exercise may also positively impact the physiology of the aging brain. However, evidence surrounding the characteristics of effective physical exercise interventions in terms of exercise type, intensity, duration, and frequency remains limited.



- Chen KM, Kuo CC, Chang YH, Huang HT, Cheng YY. Resistance Band Exercises Reduce Depression and Behavioral Problems of Wheelchair-Bound Older Adults with Dementia: A Cluster-Randomized Controlled Trial. *J Am Geriatr Soc.* 2017 Feb;65(2):356-363.

OBJECTIVES: To test the effects of a 15-month wheelchair-bound resistance band exercise program on depression and behavioral problems of wheelchair-bound older adults with dementia. DESIGN: Single-blind, cluster-randomized controlled trial with repeated measures. SETTING: Eight nursing homes in southern Taiwan. PARTICIPANTS: Wheelchair-bound nursing home older adults with dementia who participated voluntarily (N = 150) were cluster-randomized to two groups (experimental or control group); 127 completed the study (experimental: four nursing homes, n = 65; control: four nursing homes, n = 62). INTERVENTION: The resistance band exercises were conducted three times per week in 40-minute sessions in the following two sequences: volunteer-led sessions for the first 6 months (Stage I) followed by DVD-guided sessions for the next 9 months (Stage II). MEASUREMENTS: Depression, as measured using the Cornell Scale for Depression in Dementia, and behavioral problems, as measured using the Clifton Assessment Procedures for the Elderly-Behavior Rating Scale, of participants were observed at six time points at 3-month intervals: pretest, two posttests at Stage I, and three posttests at Stage II. RESULTS: By the sixth month of the study, experimental group participants were significantly less depressed and had fewer behavioral problems than control group participants (all P < .05). These small but statistically significant differences persisted throughout the 9 months of the DVD-guided sessions (all P < .05). CONCLUSION: Volunteer-led sessions followed by DVD-guided sessions of resistance band exercise is effective and practical in institutional settings. © AGS.



- Galloza J, Castillo B, Micheo W. Benefits of Exercise in the Older Population. *Phys Med Rehabil Clin N Am.* 2017 Nov;28(4):659-669.

Older adults 65 years of age and older compose a great portion of the US population. Physiologic changes of aging that limit function and general quality of life occur at a faster rate as we get older. There is high-quality evidence that exercise activity has many favorable benefits for older adults. The ideal exercise program in older adults should include aerobic, resistance, flexibility, and balance training. The exercise recommendations should be individually tailored to the abilities, precautions, and goals of each person. They also should be of sufficient intensity, volume, and duration in order to achieve maximal benefits.



- Kato Y, Islam MM, Koizumi D, Rogers ME, Takeshima N. Effects of a 12-week marching in place and chair rise daily exercise intervention on ADL and functional mobility in frail older adults. *J Phys Ther Sci.* 2018 Apr;30(4):549-554.

[Purpose] To determine the effects of a 12-week intervention consisting of marching in place and chair rising daily exercise on activities of daily living and functional mobility (ability to quickly rise from a chair and walk) in frail older adults. [Subjects and Methods] Thirty-one participants were divided into exercise (n=18, age=77.6 ± 7.2 years; 11 males, 7 females) and non-exercise (n=13, age=79.6 ± 7.7 years; 7 males, 6 females) groups. The exercise group performed 12 weeks of training, 7 days per week, and 20 minutes per session. The exercise program consisted of low to moderate intensity marching in place and chair rising movements. The speed of movements was gradually increased over time. The Barthel index, mean power during chair stand, and time to complete a 10-m walk were assessed before and after the intervention. [Results] Significant improvements were noted in the exercise group compared to the non-exercise group for the Barthel Index (11.6%), mean power (33%), and 10-M walk (14.6%) with a medium effect size, and relative mean power (power/body mass) (32.9%) with a large effect size. [Conclusion] The progressive marching in place and chair rising exercise intervention appears to be effective in improving activities of daily living and functional mobility among frail older adults.



- Krell-Roesch J, Feder NT, Roberts RO, Mielke MM, Christianson TJ, Knopman DS, Petersen RC, Geda YE. Leisure-Time Physical Activity and the Risk of Incident Dementia: The Mayo Clinic Study of Aging. *J Alzheimers Dis.* 2018;63(1):149-155.

We conducted a prospective cohort study derived from the population-based Mayo Clinic Study of Aging. We investigated if leisure-time physical activity among individuals with mild cognitive impairment (MCI) was associated with a decreased risk of developing dementia. 280 persons aged  $\geq 70$  years (median 81 years, 165 males) with MCI and available data from neurologic evaluation, neuropsychological testing, and questionnaire-based physical activity assessment, were followed for a median of 3 years to the outcomes of incident dementia or censoring variables. We conducted Cox proportional hazards regression analyses with age as a time scale and adjusted for sex, education, medical comorbidity, depression, and APOE  $\epsilon 4$  status. Moderate intensity midlife physical activity among MCI participants was significantly associated with a decreased risk of incident dementia (HR=0.64; 95% CI, 0.41-0.98). There was a non-significant trend for a decreased risk of dementia for light and vigorous intensity midlife physical activity, as well as light and moderate intensity late-life physical activity. In conclusion, we observed that physical activity may be associated with a reduced risk of dementia among individuals with MCI. Furthermore, intensity and timing of physical activity may be important factors when investigating this association.



- Lee PG, Jackson EA, Richardson CR. Exercise Prescriptions in Older Adults. *Am Fam Physician.* 2017 Apr 1;95(7):425-432.

Regular physical activity and exercise are important for healthy aging and are beneficial for chronic disease management. Exercise prescriptions for older adults should account for the individual's health status and functional capacity. Any amount of exercise is better than being sedentary, even if health status prevents a person from achieving recommended goals. For most health outcomes, more benefits occur with physical activity performed at higher intensity, greater frequency, or longer duration. Guidelines recommend at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity and at least two days of muscle-strengthening activities per week. Key components of the prescription include setting achievable activity goals, identifying barriers and providing potential solutions, and providing specific recommendations on the type, frequency, and intensity of activities. Older adults will derive distinct benefits from aerobic exercise, strength or resistance training, flexibility or stretching exercises, and balance training. Many community resources are available to help older adults begin a more active lifestyle.



- Sahin UK, Kirdi N, Bozoglu E, Meric A, Buyukturan G, Ozturk A, Doruk H. Effect of low-intensity versus high-intensity resistance training on the functioning of the institutionalized frail elderly. *Int J Rehabil Res.* 2018 Apr 3. doi: 10.1097/MRR.000000000000285. [Epub ahead of print]

Frailty has emerged as an important risk factor for disability. Age-related declines in physical and physiological function lead to increased risk of loss of independence and poor quality of life. Recent evidence has shown the effectiveness of physical exercise programs in preventing or reversing frailty. The aim of this study was to evaluate changes in the functioning of frail elderly individuals after undergoing resistance training for 3 days a week for 8 weeks. The effectiveness of exercise training was investigated in 48 frail elderly individuals who were randomly assigned to the following intervention groups: high-intensity (HI; n=16; age: 69-96 years) or low-intensity (LI; n=16; age: 77-93 years) strength training groups or a control group (n=16; age: 76-93 years) with no specific exercise program. Participants were assessed for muscle strength, physical function, activities of daily living, depression and quality of life. The HI group had significantly better results ( $P < 0.05$ ) on the Short Physical Performance Test than the LI group; however, the LI group did show a significant improvement in those scores, whereas the scores of the control group worsened. Results for the other evaluations were similarly favorable in both exercise groups ( $P > 0.05$ ). The study showed that LI exercise was as effective as HI exercise for most parameters tested. Exercise training is useful for the prevention or treatment of frailty, as it improves functioning by contributing positively to muscle strength, gait, balance and quality of life.



- Smolarek Ade C, Ferreira LH, Mascarenhas LP, McAnulty SR, Varela KD, Dangui MC, de Barros MP, Utter AC, Souza-Junior TP. The effects of strength training on cognitive performance in elderly women. *Clin Interv Aging*. 2016 Jun 1;11:749-54.

Aging is a degenerative process marked by recognized functional, physiological, and metabolic impairments, such as dynapenia and diminished cognitive capacity. Therefore, the search for innovative strategies to prevent/delay these physiological and cognitive disorders is essential to guarantee the independence and life quality of an elderly population. The aim of this work is to verify the effect of a 12-week resistance exercise program on the general physical aptitude and cognitive capacities of elderly and sedentary women. Twenty-nine women (65.87±5.69 years) were divided into two groups. The control group was composed of eight elderly women who met the same inclusion criteria of the study and the strength training group was composed of 29 elderly women who were subjected to a resistance exercise program defined by 12 upper and lower limb exercises combined in 3×10 repetitions with 1-minute interval between repetitions and two resting minutes between exercises (three times/week). Weight loads were fixed between 60% and 75% of the apparent 1 repetition maximum, which was estimated by the test of 10 maximum repetitions. The direct curl was performed for upper body strength evaluation with 2.3 kg dumbbells for 30 seconds, whereas the chair test was used for lower body evaluation (total sit-stand movements in 30 seconds). The cognitive capacities of subjects were evaluated by "The Montreal Cognitive Assessment" questionnaire. After 12 weeks, the elderly group showed significant increases in the average upper body strength (58%), lower body strength (68%), and cognitive capacity (19%). The present study demonstrated that regular resistance exercises could provide significant gains on the upper and lower body strength concomitant to positive improvements on cognitive capacities of elderly women, bringing enhanced life quality.



- Tomás MT, Galán-Mercant A, Carnero EA, Fernandes B. Functional Capacity and Levels of Physical Activity in Aging: A 3-Year Follow-up. *Front Med (Lausanne)*. 2018 Jan 9;4:244.

Over the last decades, the world elderly population has increased exponentially and this tendency will continue during the coming years; from 2000 to 2050, people over 60 will double and those over 80 will quadruple. Loss of independence occurs as people age due to mobility restrictions, frailty, and decreased functional fitness and cognitive abilities. Evidence has shown that appropriate programs and policies contribute to keep older adults healthy and independent over time. The purpose of this chapter is to report the results of our 3-year follow-up study designed to characterize functional physical fitness in a sample of Portuguese community-dwelling older adults to propose a set of functional parameters that decline the most. We studied a group of 43 elderly people, aged 60 and over. Variables assessed on the participants were anthropometric measurements, functional capacity with the Senior Fitness Test battery (muscle strength, aerobic endurance, flexibility, agility, and dynamic balance), handgrip strength, levels of physical activity, and balance. Three years after the first assessment, a second assessment of the same variables was conducted. We analyzed what were the variables that, for this group, were related with a healthier aging and the relation with different physical activity levels. Our study showed that the distance covered in 6-min walk test and handgrip strength seem to explain a great amount of variability on functional variables that have changed on this period (68% of balance, lower and upper functional strength, respectively) and the active participants showed less decrements with aging in anthropometric and functional variables than those inactive or insufficiently active ( $p < 0.05$ ). Greater importance should be given to prescription of exercise targeting older adults and, specifically, walking and manual activities should be given more attention as components of a community exercise program.



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*Next Month's Issue:*

Medication-Related Falls in Dementia

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