Exercise Tailored for later Life Can Reduce Nursing Home Admissions

Posted in the *Wellness-4 Later Life* health and nutrition Series by Robert Kelley.

Fears of being placed in a nursing home preoccupy a supermajority of older adults as in surveys about their course of aging they consistently ranked memory loss, financial insecurity and losing independence as their top three concerns.[1] Yet, after age 80, the risk of being placed in a nursing home increases significantly. Seniors of advanced age experience what is termed "functional aging", that is an inevitable, progressively declining continuum in functional ability from having a stable capacity to perform daily activities through a state of physical vulnerability (influenced by cognitive loss) in which the person is losing independence. [2] At advanced ages, some caregiver support becomes necessary for many, and for some, a nursing home admission.

Although most seniors accept that the aging process accelerates physical and cognitive decline after age 80, they want to know whether they have any means to control the degree or pace of their functional losses. This article discusses the evidence-base showing that changes in lifestyle, particularly engaging in exercise targeted to improving functional fitness even in seniors who were mostly sedentary, can slow and in some cases reverse functional impairment, which in turn reduces the risk of being placed in a nursing home. In fact, there is strong evidence that long-term habitual exercise is linked to a slowing of the biological aging process, which certainly enhances independence.[3]: but, studies also show that even sedentary older adults who begin to exercise in later life can see significant improvements in physical and cognitive health. [4]

Functional impairment is caused by not only age, cognitive decline, multiple chronic medical conditions or following an acute medical event, but also from lifestyle choices- a sedentary

[1] West Health Institute/NORC Survey of Aging in America, March 22, 2017: compare Aging in Place in America Study, Commissioned by Clarity and the Ear Foundation, 2007

[2] *Bending the Age curve,* Joseph Senorile, published by Human Kinetics, 2011: PP 13-14

[3] U of Birmingham Study Published in Aging Cell 2018: e12735 DOI

[4] Biogerontology, 2016: 17: 567-580

lifestyle is shown to decrease functional fitness levels which in turn increases functional impairment while engaging in a physically active lifestyle appears to derive a polar opposite effect. [5] Functional impairment reduces ability to perform activities of daily living, "ADL's": [6] and, consequently, the most common reason that very old adults are placed in a nursing home is loss of ability to perform ADL's. [7] (Over 80% of nursing home residents need assistance with 3 or more ADL's). Thus, when functional fitness is improved through exercise, that is, when an older adult experiences an enhanced ability to the summon strength, energy and executive function needed to carry out basic ADL's, independence is retained for longer which reduces the risk of being placed in a nursing home. [8]

Functional Training in later Life can Preserve Independence for Longer

Wellness-4 Later Life is a proprietary wellness-based activities program developed at Everbrook Senior Living to empower residents of its senior living communities to participate in wellness-based activities (only exercise is discussed here) proven in research to improve functional fitness and overall quality of life. The consensus view among fitness experts, clinicians and researchers is that physical activity and physical fitness are immensely powerful in their ability to both lengthen life and enhance quality of life in the oldest populations. [9]. And, in addition to improving physical and cognitive function, "regular exercise provides a myriad of health benefits in older adults, including improvements in blood pressure, diabetes, lipid profiles, osteoarthritis and neurocognitive function".[10] Research also shows that persons with disability who exercise improved quality of life and reduced depression. [11]Moreover, research suggests that

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[5] Comprehensive Physiology: April 2012: 630

[6] ADL's are functions we manage each day including bathing (showering), dressing, eating, ambulation, grooming, and toileting (incontinence) assistance.

[7] The Gerontologist 1992, 32 (5): 634-640

[8] BMC Geriatr. 2007, 7: 13-10.1186/1471-2318-7-13

[9] ACSM's Guidelines for Exercise Testing and Prescription, Ninth Ed., chapter 1;

[10] American Family Physician, February 1, 2002, vol. 65,

[11] Physical Therapy1999: 79: (5): 495-502

persons with cognitive impairment can benefit from supervised multi-modal exercises to improve physical function.[12] Yet, despite its obvious benefits, exercise is underutilized in older populations because seniors of advanced age encounter a myriad of challenges to engaging in exercise unaided by others, from lack of motivation, to lack of confidence, to the presence of disability. *Wellness-4 later Life* is designed to help participants enjoy exercise in the face of disability and declining health.

Everbrook Senior communities promote exercise for residents in whatever form a resident can tolerate and still achieve its myriad of benefits. In fact, the exercise program of *Wellness-4 Later Life* adopts the recommendations set out by *The American College of Sports medicine, ACSM, Exercise Management for Persons with Chronic Diseases and Disabilities* which are:

> *Every person with a chronic condition should be physically active, accumulating a minimum weekly total of 150 minutes of preferably moderate-intensity physical activity or, if that is too difficult, then, 150 minutes of light-intensity activity, at least 2 days per week of flexibility and muscle strengthening activities that should minimally involve a chair-sit-and-reach stretches, at least eight consecutive sit-to-stand exercises, at least 10 step-ups (or a flight of steps), and at least eight consecutive arm curls with moderate dumbbell weight.* [13]

To work around disability, illness and loss of function, the exercise program at Everbrook Senior is led by an on-site exercise physiologist trained in geriatric-focused exercise who customizes exercise regimens tailored to accommodate for each resident's unique health concerns and who designs regimens to give residents their best chance to maintain enough functional fitness to continue to meet the demands of managing daily living activities even if with some caregiver assistance. *Wellness-4 later Life* prescribes only evidence-based exercise regimens, meaning, an

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[12] Journal of Physiotherapy, 64: 4-15(2018)

[13] CDD4 at pg. 15

exercise technique that was subjected to rigorous study as having success in improving function and health of very old adults. Yet, with a three-plus year track record, the exercise program at Everbrook Senior has produced outcome measures demonstrating that for a majority of participants, many of whom were not physically fit prior to enrollment, even short-term increases in physical activity achieved improvements in cardio-fitness, strength and balance which has led to increases in overall functional fitness.

Wellness-4 Later Life 's exercise program is cutting edged as it incorporates both *functional training* and *multi-modal fitness training* (strength, aerobic, flexibility and balance training) for all persons who are at risk of needing long-term care. Stated by an Everbrook Senior's onsite exercise physiologist at a recent symposium:

> "*We introduce fun and social exercise for all residents to enjoy but we work with willing residents on a technique titled functional training so they continue to be able to rise from a chair without help, walk over distances, climb stairs, and pull themselves out of bed. We also devise exercises to work on a mix of strengthening, aerobics, flexibility and balance so residents can retain mobility while improving overall functional fitness".*

Functional training is an integral part of the exercise program at Everbrook Senior communities because studies have consistently showed that functional training such as having residents repeatedly rising from a chair or climb stairs can improve task-specific activities. [14] Functional training is intended to help seniors who have functional impairments to perform task-specific exercises that mimic daily living activities such as rising from a chair, walking or reaching for an object. [15] One study investigating the effect of an 8-week progressive functional fitness program on functional capability in assisted living residents, showed improvements in participants to the

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[14] J Gerontol. 6: M 616-M 623

[15] Brill, Functional Fitness for Older Adults, Brill, Jensen, and colleagues (1998))

baseline tests-timed-up and go test-TUG, 6-min. walk test, and chair stand. [16] It is evident that when seniors practice and perform task-specific exercises, such as the sit-to-stand exercise, they can improve their ability to rise from a chair faster than if they simply worked to strengthen lower body musculature. [17]

Wellness-4 Later Life also introduces a multimodal exercise regimen that combines muscular strengthening, cardio-fitness, flexibility, and balance training to help residents with mobility impairment and fall risks improve gait, walking speeds, balance, and coordination. Research indicates that a multicomponent or multi-modal fitness training (strength, aerobic, balance and flexibility) is most effective at improving function in persons with mobility disability. [18] Mobility disability is defined generally as when impairments in mobility restrict the ability of individuals to move about the environment in order to carry out daily living activities. [19] Also, there is strong evidence that that a multifactorial (aerobic, strength, flexibility, balance) approach to exercise should be considered the most effective intervention to reduce fall risks. [20] Finally, multi-modal exercise (strength, aerobics, balance and flexibility) showed significant improvement in physical functionality and thus improvement in ADL's in a group of frail elderly. [21]

Multimodal exercise training combined with task-specific functional training offers seniors their overall best chance to regain function or slow the pace of functional decline. However, there are techniques within each exercise mode that increases the chance of helping those willing and able participants to retain independence for longer. Strength training for example, is perhaps the most important component of any fitness program targeting very old adults. According to Research results at Tufts University, strength training is one of the best ways to combat the weakness and

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[16] Id

[17] International Journal of Exercise Science 8 (3), 224-233

[18] American Journal of Nursing. 2010: 110 (7): 30-37

[19] Journal of Aging and Physical Activity, 1999: 7 (1) 7-19

[20] Journal of Rehabilitation Research & Development, vol. 45, number 8, 2008,

[21] Clin Interv Aging 2019: 14: 209-217

frailty, conditions prevalent in seniors at risk of nursing home admission, as strength training is proven effective in building bone mass and muscular strength in very old adults.[22] Yet, for those who can tolerate higher-intensity strength training, muscle power (muscle power consists of the ability to produce force quickly) has been proven to be more effective at improving ADL performance than muscle strengthening: training muscles to experience high-velocity contractions during exercise may be a more optimal means of training older adults when the goal of the training is improving ADL function. [23]

Aerobic training is also essential to any exercise regimen delivered to very old adults. And, although even light-intensity exercise can have positive consequences to cardio-vascular health, for those able and willing, higher-intensity aerobic training, that is an exertion in a range of at least 60% of pre-training Vo2 max (Vo2 is oxygen consumption or volume of oxygen used by the body) is most optimal in producing substantial enough improvements in cardio-fitness to reverse functional impairment. [24] In fact, studies show that sedentary older adults can improve VO2 max after 4-5 months of moderate intensity exercises performed three times per week.[25] In *Bending the Age curve, The Complete Exercise Guide for Older Adults*, published by Human Kinetics, 2011, author Joseph Senorile argues for the mixing of steady-state with interval training as the most optimal approach to aiding ADL performance. (Pg. 224) Everbrook Senior provides hydraulic-based strength equipment and recumbent bikes/steppers so that seniors with disabilities can safely perform high-intensity strength or conditioning training in one session. Circuit training that combines high-intensity power training on the hydraulic weight machines combined with short-burst aerobics training on a recumbent bike or stepper can be a real help to older age seniors who can tolerate the more intense exercise regimens in their quest to retain independence.

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[22] Sequin, et al, Strength Training for Older Adults, copy write 2002-Tufts University)

[23] Journal *of* Aging, and Physical Activity, 2007, 15; 349-359: Bean, Herman, Et al 2002)

[24] ACSM 2009 Position Stand, published in Medicine & Sci. in Sports & Exercise, at pg. 1517,

[25] American Academy of Physical Medicine and Rehabilitation, Vol. 4, 833-839, Nov. 2012,

Balance training is an important component of a geriatric-focused exercise regimen because mobility impairment and poor balance are risk factors for increased falls, reduced quality of life and nursing home placement. [26] Maintaining balance requires coordination of input from multiple sensory systems including the vestibular- part of the auditory system, somatosensory- nerve cells which sense proprioception and visual systems and these systems all decline at older ages. [27]. To remain balanced, a person standing must be able to keep the vertical projection of their center of mass within their base of support, resulting in little medial-lateral or anterior-postural sway.[28] And, tests show that older adults have more body sway.[29] Yet, balance training has shown to be effective in helping seniors restore to better balance. A study published in the *New England Journal of Medicine, October, 2002*, showed that physically frail older adults who followed a physical therapy program which involved primarily balance and strength training saw a 45 % reduction in disability (functional decline) after seven months. While balance training is effective at improving balance, author Signorile argues that at agility training, which involves an ability to control changes of direction and body position quickly and effectively, is the most optimal approach to balance training for older adults. [30] Signorile's agility training focuses on eye-hand coordination, eye-foot coordination, dynamic balance, standing and leaning balance, and reaction time. [31]

Flexibility training is essential to any exercise regimen prescribed to older adults because with advancing age comes declines in flexibility which in turn can accelerate declines in mobility and ADL performance. [32] Senorile recommends a mix of Static flexibility, the ability to move a specific joint to the end of its range of motion and dynamic flexibility, an ability to actively move

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[26] The Gerontologist vol. 45: Issue Suppl_1: Oct. 2005, pages 62-67

[27] Gribble, et al, Archives of Physical Medicine and Rehabilitation 85(4): 589-592

[28] Med Sci Sports Exerc. 32 (1): 10)

[29] Archives of Physical Medicine and Rehabilitation.76: (10): 961-965)

[30] Bending the Age curve at pg. 119

[31] Id at p. 125.

[32] Bending the Age curve at pg. 69

through a full range of motion. [33] In addition to static stretches, which involve using little or no velocity while stretching and dynamic stretching which involves moving the body in a set of patterns while gradually increasing range of motion, ROM. Senorile argues for adding proprioceptive neuromuscular facilitations, PNF, which involves static stretching while using a band or rope to continue the stretch beyond its ROM. [34]According to Senorile, PNF stretching may be more effective than static stretching for improving flexibility and ADL performance in older adults. [35]

Wellness-4 later Life provides seniors of advanced ages the most innovative approaches to utilizing exercise as a means to preserve independence for longer. By working with our onsite exercise physiologists, residents of an Everbrook Senior Community are able to overcome their fears, lack of motivation or of confidence about exercise and they receive the latest most up-to date information about the enhanced benefits of specific exercise techniques such as power training, high-intensity aerobics training, agility drills and performing static stretching using a band, appropriately modified to address chronic illness and other limitations, so they have the needed tools to control the degree or pace of their functional decline, retain their independence for longer and avoid in many cases the high cost of a nursing home admission. This article and other interesting articles is published on the website at www.everbrookseniorliving.com

[33] Id at 69

[34] Id at 71

[35] Id at 73