

# CLINICAL APPLICATIONS

by Paul M. Ribisl, Ph.D., FACSM

## Running Away From Disability

If you ask older adults what they fear most as they age beyond retirement, they often will tell you that a loss of independence is their greatest concern. Most are not afraid to lose their wealth or die, but they do fear losing the ability to walk, drive, and even simply get up from the sofa. Although there is a financial side to independence, the type of independence that most concerns older individuals is functional independence. Functional independence in the elderly is often described in terms of being physically able to perform what are called Activities of Daily Living (ADLs), Instrumental ADLs (IADLs), and Advanced ADLs (AADLs). The ADLs are generally considered to include eating, bathing, dressing, getting to and using the bathroom, getting in and out of bed or chairs, and mobility. IADLs include doing light to heavy housecleaning activities, preparing meals, washing and ironing clothes, and shopping; AADLs include employment, travel, and active recreational activities (1). Most of us want to maintain our health and vigor to perform AADLs well into our final years.

### Coming Trends in Aging and Disability

From 1950 to 2000, the proportion of the population that is elderly rose from 8% to 12%, and by 2050, it is projected that one in five people in the United States will be aged 65 years or older as the baby boomer generation passes through middle and old age (2). This increase in the elderly population comes with a cost to society, and the number of U.S. adults who will experience functional disability due to



arthritis, stroke, diabetes, coronary artery disease, cancer, or cognitive impairment is expected to increase significantly over the next 25 to 50 years. Government documents reveal that the number of individuals in the United States reporting disabling conditions increased from 49 million in 1991–1992 to 54 million in 1994–1995, an increase of 11% in just 3 years; the direct medical costs for people with disabilities were \$260 billion in 1996 (3). Clearly, disability continues to be an important public health problem, even among working adults, and arthritis and rheumatism, back or spine problems, and cardiovascular disease remain the leading causes. Efforts to improve health promotion and disease prevention may be the best option to reduce the prevalence of disability-associated health conditions.

### Compression of Morbidity Theory

Ideally, our later years of life should be lived with as little chronic disease as

possible, allowing us to remain active and functional as long as possible. More than 20 years ago, James F. Fries, M.D., proposed his “compression of morbidity” hypothesis (4), which predicts “a reduction in cumulative lifetime morbidity through primary prevention by postponing the age of onset of morbidity to a greater amount than life expectancy is increased.” In other words, the best possible scenario is to live life to its fullest and die without ever becoming ill or developing a disabling chronic condition. You are compressing the time that you might be unable to perform ADLs, reducing the months ever spent in a nursing home, and postponing any type of disability. Since he developed this hypothesis, Fries and colleagues (5) have provided evidence to support this concept, and they recently demonstrated that smoking, body mass index, and exercise patterns are strong predictors of subsequent disability. In their study, individuals with better health habits not only lived longer, but disability was postponed and compressed into fewer years at the end of life. As a strong advocate of physical activity, Fries has attempted to demonstrate how physical activity is a key ingredient in the disability equation, and his most recent study (6) is the primary focus of this column.

### *The Influence of Physical Activity on Disability*

The recent literature on exercise and the value of reducing disability is promising. Whereas recent studies have emphasized the health benefits of

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CLINICAL APPLICATIONS

walking in protecting individuals from the chronic diseases of obesity (7), diabetes (8), cardiovascular disease (9), and osteoporosis (10), Clark (11) reports that walking is also protective, and adults who walked 5 to 7 days per week had a 50% to 80% reduction in lower body disability. More recently, Fries and colleagues (6) have reported on the postponed development of disability in elderly runners who were studied longitudinally over a 13-year period. The purpose of the study was to quantify the benefits of aerobic exercise, including running, on disability and mortality in elderly adults and to determine whether regular exercise can compress morbidity into the later years of life. They studied 370 members of a runners' club for participants aged 50 and older along with 249 control subjects aged 50 to 72 years at the start of the investigation. An annual assessment of disability was made with the Health Assessment Questionnaire, while data on deaths and causes were also maintained. The results of this study are very impressive and encouraging because these subjects, whose average age increased from 59 to 72 years, demonstrated negligible increases in disability if they maintained their physical activity over the 13-year period. This fact is demonstrated clearly in Figure 1,

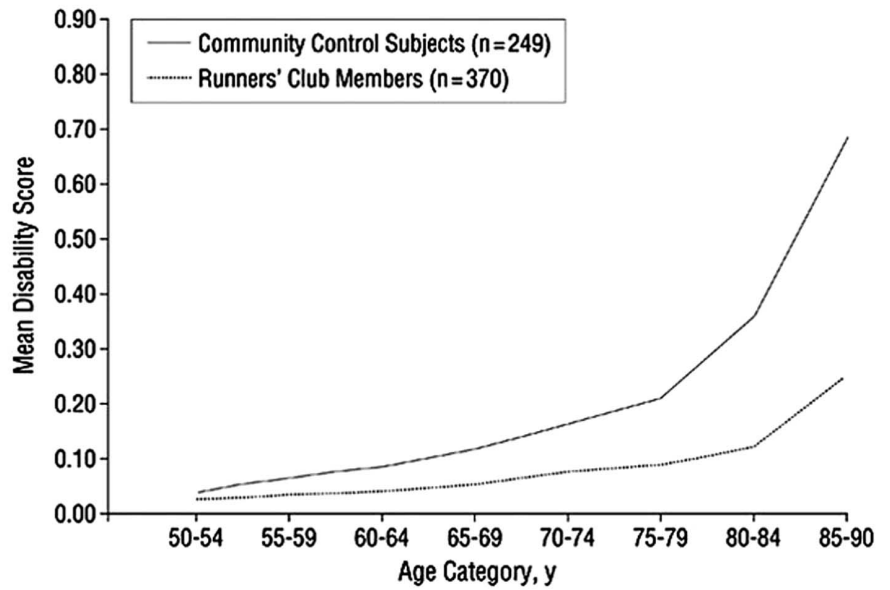


Figure 1. Mean disability scores by age category (at the 1997 questionnaire) and runner status.

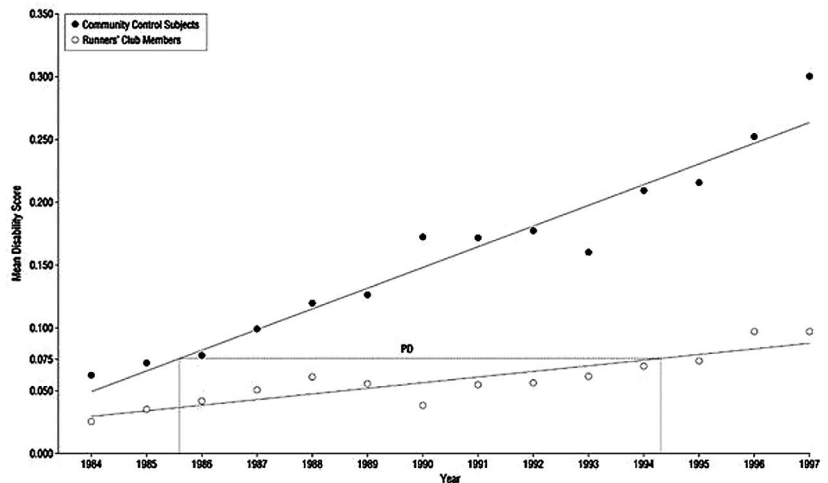


Figure 2. Linear models of the progression of disability and the postponement of disability. Runners' club members achieve a disability level of 0.075 an average of 8.7 years later than community control subjects.

where the mean disability score is plotted by age category and by activity status; the runners had a clear delay in the onset of disability at every age

The powerful impact of exercise on the progression of disability is seen in Figure 2, where the progression of disability is expressed in two regression lines, one for the controls and the other for the members of the runners' club. The slope of the two lines is markedly different, and the postponement of disability is demonstrated in Figure 2, that is, it

illustrates that a fixed level of disability score (0.075 in 1985–1986) is achieved nearly 9 years later (1994–1995) in the members of the runners' club when compared with the community control subjects.

Whereas the previous figures are related to postponement of disability and the compression of morbidity into the later years, Figure 3 illustrates that

the survival probability of the runners was enhanced significantly, where the 13-year survival of the runners was 96% in comparison with only 83% in the community controls. This translates into a 1% better survival every year for the active participants. When other factors were taken into consideration, it was found that being older, of the male sex, and a smoker

## CLINICAL APPLICATIONS

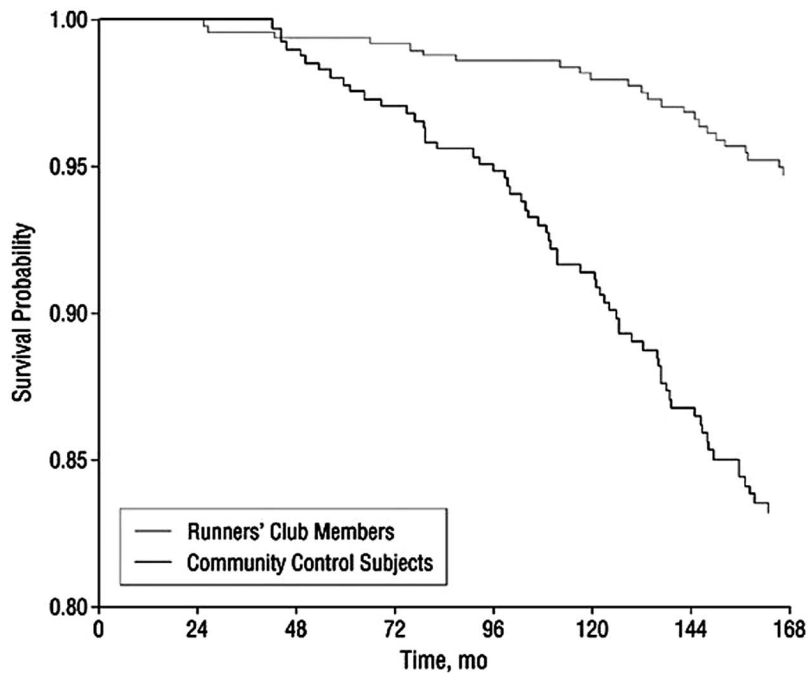


Figure 3. Survival curves for runners' club members and community control subjects from study onset through 13 years (156 months) of follow-up. The difference between the two groups remains significant ( $p < 0.001$ ) over the 13 years.

were related to an increased mortality—but the most significant factor was still participating in the running. The authors also point out that other factors may be operating to confer an advantage to the runner's club members, such as lifestyle and socioeconomic factors, awareness of health issues, association with healthy peers, and access to health care, but this will require further study.

### Do We Want Quality of Life, Quantity of Life, or Both?

The life expectancy for individuals in the United States at the turn of the 20th century was 47 years. Today it is 77 years. For most U.S. adults, those additional 30 years have been of higher quality, except in cases where there is significant comorbidity and disability. There is a finite biological limit to longevity, and it differs among individuals, but whatever our limit

may be, each of us wants the highest quality of life throughout our lifespan. If we combine daily exercise with other healthy lifestyle choices, such as nutritious eating and abstaining from smoking, perhaps we can achieve both the quality and quantity of life that is so elusive. It appears from the work of Fries and colleagues that the "fountain of youth" includes a physically active lifestyle. As health professionals, we should remain strong advocates for exercise throughout the lifespan of our clients.



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