We thank Leiper for her very kind commentary on our article. In addition, it gives us the opportunity to focus on some important topics related to our study. Two areas have been specifically addressed: the measurement of change and the importance of physical activity for people with disability.

**Measurement of Change**

We agree with Leiper about the importance of this first point. Our study showed that the change in walking capacity after aerobic training was statistically significant when compared with baseline walking capacity, but not when compared with walking capacity after neurological rehabilitation.

One possible explanation for this result is the size of the standard deviations of the measurements, which might be related to the wide range of Expanded Disability Status Scale (EDSS) scores permitted for patient inclusion. We are aware that a smaller range of EDSS scores would have selected a more homogeneous sample of subjects and probably would have reduced the size of the standard deviations. However, we chose to include subjects with mild to moderate disability subjects in the study in order to assess the effect and the feasibility of aerobic training in people with moderate disability as well. We also are aware that, in order to improve our ability to intervene in terms of mode and intensity of exercise, a better classification of subjects with multiple sclerosis as well as other diseases is needed. Although the EDSS is the most widely used rating scale for people with multiple sclerosis, it shows some limitations because it appears to be poorly sensitive to clinical change and has limited ability to distinguish among individuals in terms of their disability. Thus, we need new measures to assess both impairment and disability in people with multiple sclerosis. Consequently, the Multiple Sclerosis Functional Composite (MSFC) has been proposed by Cutter et al. and it recently has been found to be more sensitive than the EDSS in detecting changes in function as a result of regular exercise. However, the MSFC requires further validation in rehabilitation trials.

We completely agree with Leiper that the functional status measurements often are difficult to interpret because small differences may be statistically, but not clinically, significant. As Leiper points out, the minimal detectable change in the measurements is frequently obtained by statistical data processing. An alternative approach for establishing the threshold for a noticeable difference in walking capacity would be to obtain qualitative and quantitative measurements of walking from many patients over an extended period. However, when a large number of patients with chronic obstructive pulmonary disease (COPD) were each asked to rate their walking ability relative to how it had been a few months prior, a poor correlation was found between actual and perceived changes in walking ability.

Another interesting approach could rely on how individuals judge themselves relative to others with the same disease, rather than relative to their memories of past health. This approach has been successfully reported for analyzing functional status measurements in patients with arthritis and has been used for establishing a threshold distance for the Six-Minute Walk Test in patients with COPD. The latter study showed that distances needed to differ by 54 m for “average” patients to stop rating themselves as “about the same” and to start rating themselves as either “a little bit better” or “a little bit worse” (95% confidence interval = 37–71 m). This threshold distance is obviously disease specific, and further studies are needed to obtain a threshold distance in patients with multiple sclerosis.
Physical Activity and Fitness for Individuals With Disability

Continued physical activity undoubtedly should be encouraged for individuals with physical disability and for those with multiple sclerosis particularly. Limitation of physical activity secondary to multiple sclerosis-related fatigue can lead to deconditioning and thus to further worsening of exercise tolerance and functional ability, as well as to reduced participation in social and family activities.

Because leg cycle ergometry and treadmill exercise (as proposed by Newman et al7 in their recent study) represent forms of exercise that can be carried out in physical therapist practices as well as in community fitness centers or at home, continuation of physical activity should be promoted. Thus, we decidedly agree with Leiper about the need for a strict collaboration between rehabilitation professionals and community fitness centers in order to involve people with disabilities in wider fitness programs besides physical therapy programs. Functional measures such as walked distance or speed of walking could be simple functional tests that would show a meaningful change in everyday life activity in terms of improvement in social participation and overall quality of life in individuals with disabilities.

Lastly, Leiper commented on the rehabilitation intervention that was compared with the aerobic training program. As discussed in our article, we are aware that the measured outcomes were specific for the aerobic protocol and were not appropriate to detect significant changes in nonaerobic outcomes. For instance, functional measurement of balance, flexibility, or strength (force-generating capacity) by using balance tests such as the Berg Balance Scale8,9 and assessment of range of motion and isometric muscle strength10 by means of a dynamometer would probably show the superiority of neurological rehabilitation in other dimensions as compared with aerobic training. Nevertheless, the purpose of our study was to assess the effect of the aerobic program on the exercise capacity of individuals with multiple sclerosis in terms of walking capacity and maximum exercise tolerance because data on this topic are scanty.


References