A recent meta-analysis[2] reported that the efficacy of low-volume HIIT in younger adults (18–32) is uncertain and reported a small overall effect size with large confidence intervals (1.8 ± 5%),[2] partly because of improvements in control groups. The present study demonstrates that in older sedentary men, the effect on PPO is an order of magnitude greater (26.5%) than reported for younger cohorts, with a within-group increase of 17% for the intervention group between Phases B and C.

Normal aging is associated with progressive decline in PPO,[5] and it may be that participants had low initial PPO, allowing for more room for improvement than in younger individuals. Furthermore, given that variables such as intensity, effort duration, total effort, and work:rest ratio within each session were all comparable with those of previous studies,[2] the major difference in the present study is the lower exercise frequency. Consequently, the large improvements in PPO and rPPO in the intervention group are even more surprising given the lower training frequency of once every 5 days, equating to less than half that of previous investigations in younger cohorts. Correspondingly, the improvements in the intervention group were in response to a total of 27 minutes of HIIT exercise across the 6-week period. Given that a reduction in muscular power is a strong predictor of future frailty,[1] prevention of such a decline offers clear benefits to older individuals who remain functionally capable. The present cohort (56–65) was selected as the demographic that is most likely to benefit from HIIT-induced improvements in muscle function. These individuals, frequently termed "young old," typically have many years of minimally diminished functional capacity remaining and are less likely to have mobility-limiting disorders. Improvements in function or quality of muscle tissue are Consequently likely to be carried into old age and consequently increase the "health span" and not just the "life span." Furthermore, because older adults typically fail to achieve exercise guidelines[6] (150 min/wk of moderate exercise[7]), the limited time requirements of these results suggests a useful avenue for future investigations.

The results of the present study indicate that low-volume, low-frequency HIIT programs are a feasible and effective method of improving indices of peak muscular power in sedentary but otherwise healthy aging men.

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VALUES OF A BODY MASS INDEX SURROGATE IN OLDER ADULTS USING KNEE HEIGHT INSTEAD OF HEIGHT

To the Editor: Body mass index (BMI) is the most widely used weight-to-height ratio because of its correlation with all-cause mortality in adults,[1] but in elderly populations, BMI is overestimated because of height loss with increasing age. The use of equations to estimate maximum adult stature of elderly adults has not solved this problem. Recently, Tanaka et al.[2] hypothesized that a BMI surrogate with squared knee height (KH) in lieu of squared height would be a better approach to assess body mass in elderly adults. Data obtained using such a BMI surrogate (BMIS) are reported here.

Height, weight, and KH of 183 women and 102 men aged 60 to 102 was measured. They were barefoot and lightly dressed. KH was the distance from foot sole to the anterior surface of the thigh with ankle and knee flexed to a 90° angle.[3] The BMIS was calculated using KH instead of height in the BMI equation (BMIS = weight (kg)/KH (cm^2) and the result multiplied by 1,000 to make them comparable in magnitude to the BMI values because the use of squared centimeters in lieu of squared meters in the BMI equation led to very small BMIS values. The elderly population studied has been described in more detail in previous reports.[3,4]

The 285 subjects were divided according to age (<80 vs ≥80) and sex to form four age–sex groups. With the exception of KH, there were significant differences in all variables according to age group for men and women, including BMIS/BMI ratio (Table 1). Sex differences within age groups are shown in the footnote to Table 1; women had significantly higher BMI and BMIS than men but

Table 1. Age and Sex Group Differences in Body Mass Index (BMI) BMI Surrogate (BMIS), and Anthropometric Variables in Four Groups According to Age and Sex

	<80		≥80		
Variable	N	Mean ± SD	N	Mean ± SD	*P*-Value
BMIS, kg/(cm²/1,000)					
Men	63	29.8 ± 5.6	28	23.3 ± 4.3	<.001
Women	103	33.7 ± 9.2	65	26.6 ± 6.7	<.001
BMI, kg/m²					
Men	63	26.9 ± 3.8	28	22.8 ± 3.9	<.001
Women	103	30.7 ± 6.1	64	27.2 ± 5.6	<.001
BMIS–BMI ratio					
Men	63	1.11 ± 0.15	28	1.02 ± 0.10	.005
Women	103	1.09 ± 0.16	64	0.98 ± 0.12	<.001
Knee height, cm					
Men	64	49.0 ± 3.6	34	48.9 ± 3.7	.87
Women	106	45.2 ± 3.2	71	45.4 ± 4.7	.68
Weight, kg					
Men	63	71.0 ± 12.9	28	55.9 ± 9.8	<.001
Women	103	67.4 ± 13.4	65	54.5 ± 12.7	<.001
Height, cm					
Men	63	162.1 ± 8.2	31	156.5 ± 7.9	<.001
Women	106	148.2 ± 6.0	68	141.6 ± 7.4	.002

SD = standard deviation.
There were significant intersex differences in both age groups in BMI, BMIS, knee height, and height.
There was not a significant intersex difference in either age group in the ratio of BMIS to BMI or weight.

lower BMIS/BMI ratios albeit not statistically significantly lower.

The BMIS/BMI ratio can be seen as an intrasubject paired comparison between BMI and BMIS, and as such, a smaller ratio would be the result of decreasing height with increasing age in the numerator and unchanged KH in the denominator. The lower ratio in the older subjects suggests that height loss may still occur after 80 years of age. The percentile distributions of the ratio in the four age–sex groups were similar in shape and differed only in their magnitude, which was a positive gradient from older women to older men to younger women to younger men. A ratio of 1 corresponded to the 50th percentile in the older men and women pooled and to the 25th percentile in the younger men and women. A ratio of 1 should correspond to a percentile below the 25th in populations aged 30 to 60 because they would be in the process of losing the 5 to 8 cm of height that occurs from age 30 to 80.[5]

In support of the current findings is that KH remains unchanged in individuals followed for many years.[6] The option of using height corrections to calculate habitual BMI as proposed previously[7] failed in the current sample because more than 30% of corrected values were less than measured height. Such results go against the correction's rationale and invalidate it as a procedure to correct the height of older adult. The BMIS outlined here is proposed as an index that can identify overweight and obesity in populations in whom height cannot be measured or has changed with age. A weight-to-height ratio not influenced by age such as this surrogate would be a welcome tool in evaluating malnutrition in elderly adults, which is a major health problem. We agree with the hypothesis of Tanaka et al.:[2] "Despite many parameters currently available, such as anthropometric and laboratory ones, there is no consensus on what parameter would best predict the nutritional status of the elderly. We believe that BMI–KH could be a promising alternative to BMI."

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