

Editorial

Impact of sports type on handgrip strength and morbidity/mortality

Physical activity can be planned (e.g., sports) or unplanned, but the lack of activity is associated with premature mortality.¹ It is estimated to be a principal cause of ischaemic heart disease, diabetes, and breast/colon cancer.¹ However, different types of sports may have different effects on healthspan and possibly lifespan. For example, Oja and colleagues (2017) investigated the associations of specific types of sports and exercise with all-cause and cardiovascular disease mortality in a large pooled British-based (80,306 individuals, 54% women, mean age 52 years old) cohort.² The authors found significant reductions in all-cause and cardiovascular disease mortality for those who participated in swimming, racquet sports (badminton, tennis, squash), and aerobics (i.e. aerobics, gymnastics, dance for fitness) compared to those not participating in any activity. In contrast, no significant associations were found for participation in football and running. Schnohr and colleagues (2018) also investigated the differential improvements in life expectancy associated with participation in various sports among adults (8,577 participants) in Copenhagen.³ They reported that multivariate-adjusted gains in life expectancy compared to the sedentary group were 9.7 years for tennis and 6.2 years for badminton, while soccer and jogging were 4.7 and 3.2 years, respectively. Furthermore, a Japanese researcher investigated the lifespan of Japanese male athletes and reported that kendo, tennis/table tennis, and rowing were listed to have longer lifespans.⁴ Collectively, these aforementioned results suggest that various sports are associated with different impacts on health and longevity. The sports can be divided into those that use the “upper + lower body” simultaneously and sports that primarily use the “lower body” depending on the muscle activity in the upper and lower limbs during the sport. From this perspective, sports involving the upper + lower body may impact mortality and life expectancy differently than sports involving the lower body alone.

Ample evidence suggests an inverse association between handgrip strength and morbidity and mortality.⁵⁻⁷ Most of these studies measured handgrip strength in middle-aged and older adults (several studies targeted adolescents) and investigated the associations between handgrip strength and morbidity and mortality in follow-up surveys. However, handgrip strength, determined in early adulthood, may change only with age-related decline or when injury/disease occurs.^{8,9} Thus, the handgrip strength acquired during the developmental period until adulthood is thought to be of great importance. Recent studies revealed that the type of sport played, i.e., whether or not an athlete played with sports equipment in their hands (i.e., “upper + lower body” sports or “lower body” sports), might influence the development of handgrip strength during the period of growth.¹⁰ These “upper + lower body” sports may contribute to higher handgrip strength in early adulthood.^{11,12} On the other hand, sports impact more than just handgrip strength and that may confound possible relationships. For example, muscle activity itself is associated with numerous signaling pathways. It is presently unclear how different types of sports (i.e., upper + lower body vs. lower body) impact future risk for morbidity and mortality. Solving this research question would allow for a greater understanding of how sports (upper + lower body and lower body-centric) impact both healthspan and lifespan. This would also help clarify the direction and meaning of the association. That is, does poor handgrip strength lead to poor health or does poor health lead to poor handgrip strength.

Research on the association between changes in handgrip strength and risk factors for lifestyle-related diseases in children and adolescents seems essential to clarify the mechanisms of the inverse association between handgrip strength and morbidity/mortality. A follow-up study reported inverse associations between baseline handgrip strength and changes in inflammation markers in older women and speculated that inflammation markers partly explained the association between handgrip strength and mortality.¹³ In addition, a systematic review and meta-analysis reported that higher levels of circulating inflammatory markers are significantly associated with lower muscle strength, including handgrip strength in adults (≥ 18 years).¹⁴ Therefore, an inverse association exists in adults between handgrip strength and inflammatory markers, which may affect lifestyle-associated morbidity and mortality. However, whether the above association is similarly observed during developmental periods when handgrip strength changes still needs to be better understood. Additionally, it is important to understand the influence of participation in different types of sports on this relationship. Future studies are expected to elucidate further the contribution of sports during the

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developmental period to the association between handgrip strength and morbidity and mortality.

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