

Granic A, Davies K, Jagger C, Kirkwood T, Syddal HE, Sayer AA.

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In: 60th Annual Scientific Meeting Society for Social Medicine. 2016, York: BMJ Group.

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DOI link to article:

<https://doi.org/10.1136/jech-2016-208064.130>

Date deposited:

11/12/2017

Grip strength decline and its determinants in the very old: longitudinal findings from the Newcastle 85+ Study

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Background: Low grip strength is a key component of sarcopenia and frailty and a powerful predictor of mortality, morbidity and disability. Despite increasing interest in understanding grip strength from a life course perspective, little is known about grip strength decline in the very old (aged 85+). We examined trajectories of grip strength in very old adults and identified the determinants.

Methods: Grip strength (kg) was measured at four time points over 5 years in 319 men and 526 women participating in the Newcastle 85+ Study. Mixed models were used to establish trajectories of grip strength and associated factors in all participants, men and women separately, and in those with weak grip strength (≤ 27 kg in men, and ≤ 16 kg in women) at baseline and follow-ups.

Results: In the time-only model, men experienced linear annual decline in grip strength of

-1.13 (0.8) kg (β (SE), $P < 0.001$), whilst women's decline although slower, accelerated by -0.06 (0.02) kg ($P = 0.01$) throughout the follow-up above the loss experienced in the first year. In the saturated model, higher baseline physical activity, height, fat-free mass, and better self-rated health were associated with stronger grip strength initially in both sexes. Annual grip strength decline in men and participants with weak grip strength who were highly physically active was slower by 0.95 and 0.51 kg, respectively compared with inactive counterparts.

Conclusion: Grip strength decline in this cohort of very old adults followed linear (men) and curvilinear (women) trends. High levels of physical activity were protective in men and in those with overall weak grip strength. These findings have relevance to the design of interventions to improve muscle strength in later life.