Increase omega-3 index in older adults to reduce heart rate during sleep and activity: a small daily supplement of fish oil is all you need.

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Background: A low omega-3 index (linked to low fish consumption) is associated with elevated cardiovascular risk. Elevated heart rate (HR) is also an independent risk factor for cardiovascular mortality and morbidity, in both healthy individuals and heart disease patients, at least in part by reducing cardiac oxygen consumption. Animal studies demonstrate dietary fish oil reduces: HR; oxygen consumption; and arrhythmia vulnerability, while regular fatty fish consumption or high dose fish oil supplements reduce HR in epidemiology, physiology laboratory and clinical trials.

Purpose: Can low supplemental intake of fish oil raise omega-3 index and reduce cardiac parameters of cardiovascular risk in older adults?

Methods: Physically fit, healthy older adults (70±1 y) were randomised to receive 2g/d of either DHA-rich fish oil (FO; n=9) (delivering 560mg/d DHA and 140mg/d EPA), or high oleic sunflower oil (control; n=8) (1700mg/d oleic acid) for 16w. Omega-3 index (% red blood cell EPA+DHA) was measured before and after supplementation. Participants wore an ambulatory ECG monitor overnight and while completing a series of physical fitness tests, including speed walking over 400m indoors. Heart rate and heart rate variability (HRV) were measured during rest (including overnight sleep), exercise states and recovery.

Results: Omega-3 index was significantly increased after FO supplement (mean±SEM, control: pre 6.1±0.3, post 5.9±0.2; FO: pre 6.0±0.2, post 8.3±0.4). Mean sleeping HR overnight was not significantly different (control: pre 62±2, post 60±2; FO: pre 60±2, post 57±2, P=0.28). Mean overnight HR nadir (10 min average) was significantly decreased by FO (control: -0.2±1.0; fish oil: -3.8±1.2 bpm, P<0.05) without changes in HRV (P>0.05). Mean steady-state HR during 400m walk was reduced (control: pre 120±2, post 124±2; FO: pre 122±2, post 115±2 bpm, P<0.01) without change in walking speed (control: pre 1.55±0.06, post 1.58±0.07; FO: pre 1.59±0.05, post 1.59±0.06 m/s). There were no changes in strength or physical fitness measures.

Conclusions: A daily DHA-rich fish oil supplement, equivalent to two meals of fatty fish per week, elevated the omega-3 index in older adults. This was associated with lower heart rate during sustained physical activity (unaltered walking speed suggests improved oxygen efficiency) and during sleep (unaltered autonomic activity suggests lower intrinsic heart rate). A supplemental DHA-rich fish oil, in low doses, can reduce heart rate in older adults, with implications for reduced cardiovascular risk and prevention of cardiac events.