

Age Influences Upper Extremity Arm Force During Functional Mobility Before But Not After Feedback: Sternal Precaution Implications

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Median sternotomy is frequently used during cardiac surgeries and to avoid complications, restriction of upper extremity (UE) pushing, pulling, and lifting to ≤ 10 lb to minimize post-surgical stress across the healing sternal halves is implemented. This can cause loss of functional independence, especially for older patients.

My study purposes were to determine: 1) if older patients can estimate as accurately as younger patients using force < 10 lb through their UE when performing functional tasks and 2) if feedback training improves patients' ability to estimate UE force < 10 lb during functional tasks equally in older vs younger patients. Subjects ($n = 31$) were between the ages of 18-40 and 60-85 years. I designed an instrumented walker to measure UE force during 4 functional tasks. Subjects also underwent visual and auditory concurrent feedback training. Baseline UE force in older subjects was >10 lb for all tasks (14.6-28.3). Arm force was greater in older vs younger subjects during front-wheeled walker ambulation (14.6 vs 11.7 lb) and sit-to-stand transfers (28.3 vs 17.7 lb) but not different during standard walker ambulation or stand-to-sit transfers. After feedback training UE force was not different between younger vs older subjects. Results indicate that patients may be over-estimating UE force during weight bearing activities and therefore be at risk for sternal complications following open heart surgery. Measurement of UE force and feedback training could help improve outcomes in older patients recovering from median sternotomy by facilitating safe but timely resumption of activity during recovery.