Changes In Muscle Power After Usual Care Or Early Structured Exercise Intervention in Acutely Hospitalized Older Adults: A Secondary Analysis Of A Randomized Controlled Trial.

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(Purpose not reported)

Purpose: To assess the effects of a multicomponent exercise training intervention on dynamic and isometric maximal muscle strength of lower and upper extremities and muscle power output in acutely hospitalized older adults.

Methods: A secondary analysis of a single-blind randomized clinical trial in an acute care for elderly (ACE) unit in a tertiary public hospital in Navarra (Spain). 370 hospitalized patients (aged ≥75 years) were randomly allocated to an exercise intervention (n=185) or a usual care (n=185) group. The intervention consisted of a multicomponent exercise-training program performed during 5-7 consecutive days (2 sessions/day). The usual care group received habitual hospital care, which included physical rehabilitation when needed. The main endpoints were change in maximal dynamic strength (i.e., leg-press, chest-press, and knee extension exercises) and maximal isometric knee extensors and hip flexors strength from baseline to discharge. Changes in muscle power output at submaximal and maximal loads were also measured after the intervention period.

Results: The physical exercise program provided significant benefits over usual care. At discharge, the exercise group showed a mean increase of 19.6 kg (95% confidence interval [CI], 16.0, 23.2; p<0.001) on the one-repetition maximum (IRM) in the leg-press exercise, 5.7 kg (95%CI, 4.7, 6.8; p<0.001) on the IRM in the chest-press exercise, and 9.4 kg (95%CI, 7.3, 11.5; p<0.001) on the IRM in the knee extension exercise compared to usual-care group. There were improvements in the intervention group also in the isometric maximal knee extension strength (14.8 Newtons (N); 95%CI, 11.2, 18.5 vs. 7.8 N; 95%CI, -11.0, -3.5 in the control group; p<0.001) and the hip flexion strength (13.6 N; 95%CI, 10.7, 16.5 vs. 7.2 N; 95%CI, -10.1, -4.3; p<0.001). Significant benefits were also observed in the exercise group for the muscle power output at submaximal loads (i.e., 30%1RM, 45%1RM, 60%1RM, and 75%1RM, all p<0.001) over usual care group.

Conclusions: An individualized, multicomponent exercise-training program, with special emphasis on muscle power training, proved to be an effective therapy for improving muscle power output of lower limbs at submaximal loads and maximal muscle strength in very old patients during acute hospitalization.

Power training (PT) in older adults can improve muscle power and functional performance. The majority of studies have utilized higher intensities for training (≥ 60% of maximum strength) and have included combined results for older men and women. Less is known about the effects of low-intensity PT on muscle performance and function in older, healthy women. In addition, the dose-response of PT on power and function with 1, 2, or 3 days/week in older adults has not been determined.

Purpose: The purpose of this study was to investigate the impact of different weekly frequencies of low-intensity PT on muscle strength, power, and function in healthy, older, untrained women.

Methods: Older women (n = 54) were randomized to PT1 (n = 14), PT2 (n = 17), or PT3 (n = 17) days/week or wait-control (n = 15). Participants undertook 12 weeks of PT using lower-body resistance training machines at an intensity of 40% of the 1-repetition maximum (IRM), and performed the concentric phase of the exercises ‘as fast as possible’. The primary outcome was functional performance (Short Physical Performance Battery, stair climb, 30 second chair stands, and 400 meter walk) and secondary outcomes were strength (leg-press IRM) and power (knee-extension power at 40% of maximal isometric strength).

Results: Within-group analyses (pre-post time points) indicated that strength improved in all PT groups (p < 0.05) with a 23.7%, 23.3%, 34.8%, and 9.8% increase from baseline to discharge for PT1, PT2, PT3, and C, respectively. Pre-post power improved significantly in PT2 and PT3 (p < 0.05) by 9.6% and 12.2%, respectively. For pre-post function, all PT groups improved in 3 of 4 functional tests (p < 0.05) with improvements ranging from 4.0 - 21.7% and with no differences observed between groups. Although the control group showed small but significant improvement in some aspects of function over the course of the study, effects sizes for all PT groups suggest small to large improvements above that observed in the controls. The large intra-individual variability in the data might have limited statistical power to detect differences between the groups.

Conclusions: PT of 2 days/week or more might be recommended for improving muscle power, however, 1 session weekly might be sufficient for improving functional performance.

Effectiveness Of Aquatic Exercise On Dynamic Balance In Older Adults: A Systematic Review And Meta-analysis

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Balance and mobility impairments are the leading causes of falls in older adults. Aquatic-based exercises have been broadly practiced as an alternative to land-based exercises due to several beneficial effects. However, there has been no systematic review with meta-analysis regarding the effects of aquatic exercises on dynamic balance in older adults.

Purpose: To compare the effectiveness of aquatic exercises (AE) to land exercises (LE) on dynamic balance in older adults.

Methods: Electronic databases (PubMed, MEDLINE, CINAHL, SPORTDiscus,psyINFO), from inception to March 2019, were searched. Studies met the following eligibility criteria: Randomized controlled trials, English language, older adults aged 65 years or older, a minimum of one AE group and one LE group, at least one assessment for dynamic balance. For the meta-analysis, the effect sizes of dynamic balance outcomes were calculated using a weighted mean difference (WMD) or a standardized mean difference (SMD) and a 95% confidence interval (CI).

Results: A total of 9 trials met the inclusion criteria, and 7 studies including 328 participants (age = 69.6 ± 6.4yr) were eligible for the meta-analysis. Exercise intervention duration and frequency varied from 4 to 20 weeks, from 2 to 5 sessions per week, from 45 to 60 min per session. The tests most used in the studies were Berg Balance Scale (BBS), Tinetti scale, gait assessment, Functional Reach Test (FRT), Timed Up and Go test (TUG), and Five Times Sit-to-Stand test (FTSTTS). The meta-analysis showed that older adults in AE groups demonstrated comparably enhanced dynamic balance compared with those in LE groups (SMD = 0.38; 95% CI, 0.16-0.60). Subgroup analysis showed that there were no differences in BBS (WMD = 1.66; 95% CI, -0.27-3.59; P = 0.09), FRT (WMD = 2.40; 95% CI, -3.38-8.18; P = 0.42), TUG (WMD = 0.68; 95% CI, -0.08-2.04; P = 0.70), and FTSTTS (WMD = 2.05; 95% CI, -0.59-4.70; P = 0.13) between AE and LE groups.

Conclusion: AE may have comparable effects on dynamic balance abilities in older adults aged 65 years or older when compared to LE, which implies that AE may serve as a safe low-impact alternative to LE. Older adults may participate in various physical activities in the safer aquatic environment to improve dynamic balance and possibly reduce the risk of falls.