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EFFECT OF GRADED ELASTIC BAND EXERCISE AND BALANCE TRAINING ON CARDIOVASCULAR CAPACITY AND FUNCTIONAL MOBILITY IN SUBACUTE AND CHRONIC STROKE

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Background and Purpose Conventional subacute and chronic stroke rehabilitation programs do not provide adequate exercise to maintain the diminishing cardiovascular capacity levels. This randomised controlled trial aims to investigate the feasibility of supervised graded elastic strengthening training for patients with subacute stroke. To explore the

effectiveness of strengthening and balance training that can improve the cardiovascular capacity and functional mobility in their chronic phase.

Methods and Design Twenty five subjects (age: 51.3±10.8 years) with stroke in stable subacute phase were recruited at baseline and randomly allocated to receive the supervised graded elastic strengthening training (n=13) and conventional rehabilitation programs (n=12). All participants were examined by cardiac exercise testing (Marquette Case 8000 Exercise Testing System, GE, USA) to ascertain the appropriate dose of training program at baseline, 4 weeks and 12 weeks. The inpatient subjects of two groups performed the training program in hospital under the full supervision of physical therapist and their follow-up training program was supervised fully by home carer. The experimental group conducted the graded elastic strengthening training, plus conventional rehabilitation program three times per week over 12 weeks, while the control group only undertook conventional rehabilitation program. After 4 weeks training, the balance training program using Thera Band balance equipments were recommended in experimental group. The primary outcomes of this study were utilised (1) the cardiac exercise testing; (2) Fugl-Meyer; (3) 6 min walking test; (4) Berg balance scale; (5) WHOQOL-BREF; (6) muscle strength testing. Descriptive statistics were used to summarise personal demographic, stroke and baseline characteristics. Multivariate analysis of variance (MANOVA) was computed using baseline to 4 and 12 weeks change of all primary outcomes. One way ANOVA was performed to compare the difference for all outcomes measures between two groups.

Results Supervised graded elastic strengthening training was feasible and safe for patients with subacute stroke. The cardiovascular capacity has significantly improved in the graded elastic strengthening training and conventional rehabilitation programs after 4 weeks and 12 weeks training ($p<0.05$). There was no significant difference for cardiovascular capacity between two groups ($p>0.05$). In multivariate analysis of variance testing the overall effect, the graded elastic strengthening training improved than conventional rehabilitation programs. Both groups increased significantly in Fugl-Meyer score, Berg balance scale and WHOQOL-BREF ($p<0.05$), but no group difference which compared with baseline after 12 week training ($p>0.05$). There were significant changes for the muscle strength and 6 min walking test after 4 weeks and 12 weeks intervention in both groups ($p<0.05$). Therefore, there was a significant difference for muscle strength and 6 min walking test between two groups ($p<0.05$).

Conclusions The present study suggested that there is preliminary evidence to determine feasibility and optimal dose of supervised graded elastic strengthening training for patients with subacute stroke. Cardiovascular capacity and functional mobility were improved using supervised elastic band and balance equipments in patients with subacute and chronic stroke.