高齢者における筋力および持久的トレーニングの併用が下肢の筋機能と骨構造に及ぼす影響

—虚弱高齢者を対象としたトレーニングプログラムの検討—

天理大学　中谷敏昭
（共同研究者）京都大学　伊藤稔
天理大学　大内勝夫
大阪教育大学　灘本雅一

Effects of Resistance and Aerobic Training on Lower Extremity Functions and Ultrasound Bone Measurement in the Elderly: Low-Intensity Exercise Program for Nursing Home Residents

by
Toshiaki Nakatani and Katsuo Ohuchi
Department of Health and Sport Sciences,
Tenri University
Minoru Ito
Prof. Emeritus, Kyoto University,
Masakazu Nadamoto
Graduate school of Health and Sports
Osaka Kyoiku University

ABSTRACT

This study investigated the effectiveness of an 8-week low-intensity resistance and aerobic training on lower extremity muscle function and ultrasound bone measurement in nursing home residents. Two men and 12 women, aged 69-97 years, participated in

60-min low intensity resistance and aerobic training program once or twice a week. Light resistance training consisted of two or three sets of 5-10 repetitions of following 6-8 seated leg exercises utilizing an elastic band and a tennis ball: hip extension, hip flexion, knee extension, knee flexion, ankle plantarflexion, ankle dorsiflexion, stepping exercise. Aerobic training was 20-min intermittent walking of a self-paced, rapid, zigzag and obstacle course. Each session included 10 min of warm-up and cool-down stretching exercise. Primary outcome measures were body composition, activities of daily living, ultrasound bone measurement, flexibility of the knee and ankle, reaction time, foot stepping and timed up and go test. Adherence and attendance of this program were 92.9% and 90.4%. After this training, flexibility of knee and ankle joint motion and ultrasound bone measurement was not changed. The resistance and aerobic training showed 16.4% increase in reaction time（$p<0.05$）, 58.4% increase in foot stepping（$p<0.05$）, and 17.4% decrease in timed up and go（$p<0.01$）. These results suggest that an 8-week low-intensity resistance and aerobic training program is effective for improving agility and mobility for the nursing home residents. The program is revealed safe, practical and can be used in clinical setting.

要　旨

本研究は，虚弱高齢者を対象に8週間にわたる低強度の筋力および持久的トレーニングを行わせ，下肢の筋機能と音響的骨強度に及ぼす影響について検討した．被検者は本研究の運動プログラムを遂行できると判断できた特別養護老人ホームに居住する虚弱高齢男女13名（男性2名，女性11名）とした．トレーニングはウォーミングアップ，クーリングダウンを含み約60分とし週に1〜2回の頻度（1日は監視下，1日は各自）で8週間継続させた．内容は徒手，伸縮性チューブ，テニスボールを用いた低強度の筋力トレーニング（股関節伸展／屈曲運動，膝関節伸展／屈曲運動，足関節底屈／背屈運動，椅子立ち上がり，ステッピング）を座位･立位姿勢にて6〜8種目を2〜3セット行わせた．持久的トレーニングは休息を入れた約20分間のウォーキング（通常，最大，ジグザグ，踏み越え歩行）とした．8週間のトレーニング後に膝関節および足関節の可動域，踵骨の超音波骨評価値には変化は認められなかった．下肢筋機能について，8週間のトレーニング後に椅座位反応時間は16.4%短縮し（$p < 0.05$），30秒ステッピングは58.4%増大し（$p < 0.05$），Up and goテストは17.4%短縮した（$p < 0.01$）．以上のことから，短期間の低強度の筋力と持久的トレーニングは虚弱高齢者の下肢の筋機能を改善する可能性を示した．