

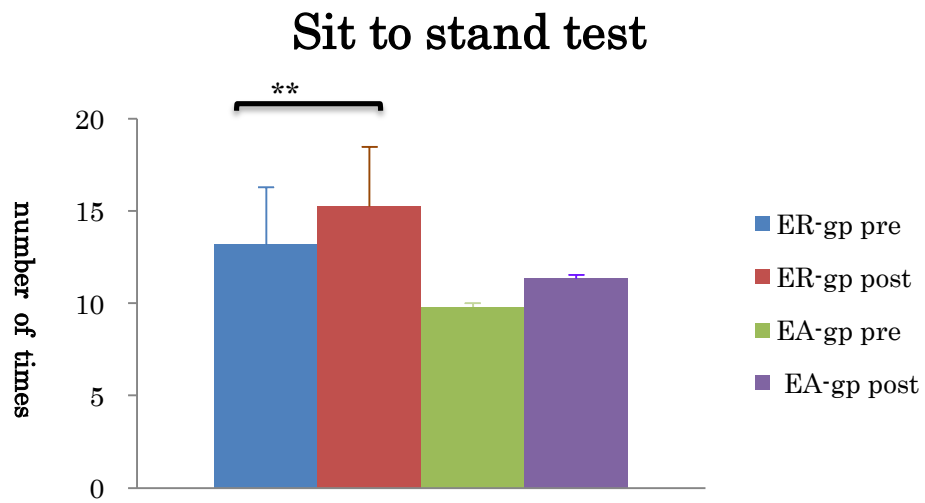
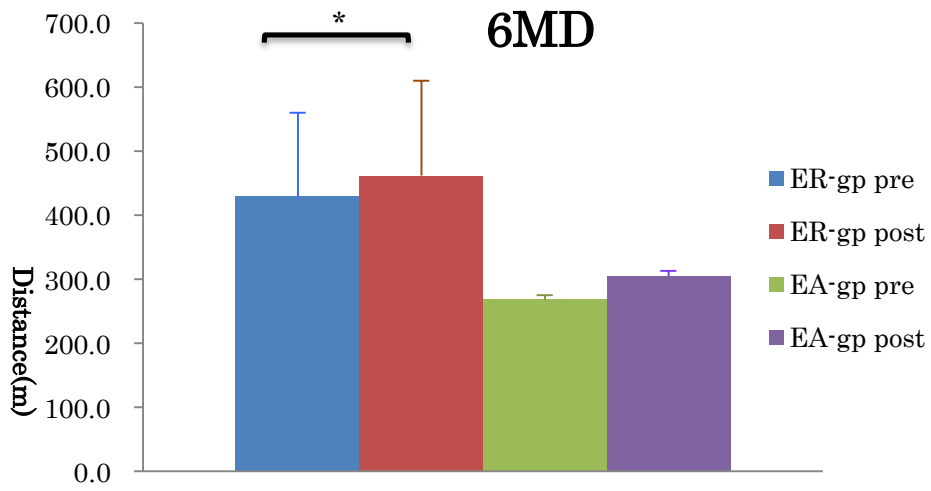
Comparing the effect of electric bicycle training and conventional exercise on physical function of end-stage renal disease patients undergoing hemodialysis

Background: While chronic kidney disease (CKD) is common in older adults, approaches to treat geriatric patients with CKD remain undefined. However, exercise training for hemodialysis patients has been shown to improve fitness, physical function, quality of life, and cardiovascular disease markers such as arterial stiffness. This study aimed to determine whether aerobic training or electrical bike exercise for 12 weeks could improve physical function and/or relevant biochemical results in geriatric patients with end-stage renal disease (ESRD). **Material and Methods:** This controlled clinical trial consisted of 71 ESRD patients (38 males, 33 females; mean age = 71.0 ± 7.3 years), randomized to receive 12 weeks of hemodialysis and concurrent aerobic training (ER-gp: n = 22), electrical bike training (EA-gp: n = 10), or no specific intervention (Con-gp: n = 39). The Borg scale was employed to control training intensity. At baseline and study completion, primary outcome measures included exercise tolerance, grip strength, quad muscle torque, balance, 10-m maximum walking and various biochemical outcomes. **Results:** In the ER-gp, cross-sectional area of the brachial muscle, quad torque, and exercise tolerance increased significantly (Figure 1, 2; $P < 0.05$). Such effects were not observed in the Con-gp. Although quad muscle torque decreased in the EA-gp, ($P < 0.05$), other parameters were not significantly altered. **Conclusions:** In this study, the safety and efficacy of aerobic training and electrical bike exercise during hemodialysis were confirmed without sudden drop of blood pressure or any other side effects. Therefore, training during hemodialysis sessions for 12 weeks may improve ESRD patient physical function by eliciting specific whole-body and local effects. (282 words)

References:

- 1) Johansen KL, Painter P: Exercise in individuals with CKD. *Am J Kidney Dis.* 2012; **59**: 126-134
- 2) Barcellos FC, Santos IS, Umpierre D, Bohlke M, Hallal PC: Effects of exercise in the whole spectrum of chronic kidney disease: a systematic review. *Clin Kidney J.* 2015; **8(6)**: 753-65
- 3) Painter P, Krasnoff JB, Kuskowski M, Frassetto L, Johansen KL: Effects of modality change and transplant on peak oxygen uptake in patients with kidney failure. *Am J Kidney Dis.* 2011; **57**: 113-122

Figure 1. Result of 6-minute walk distance (6MD) test and sit-to-stand test



*p < 0.05 vs ER-gp pre. **p < 0.01 vs ER-gp pre.