**A 12-week Renal Rehabilitation programme can produce long-term physical function and exercise capacity gains in patients with CKD**

**Background:** Low physical function has been associated with poor clinical outcomes and mortality in patients with Chronic Kidney Disease (CKD). Previous research has shown significant functional gains for patients with CKD who participate in a 12-week supervised Renal Rehabilitation (RR) programme. The purpose of this current study was to compare physical function and exercise capacity outcomes at baseline (pre-rehab), post-rehab (12 weeks) and at long-term follow up (1 year). It was our aim to determine if physical function and exercise capacity could be improved with a 12-week RR programme, and to assess if outcomes could be maintained at 1 year follow-up.

**Methods:** A retrospective analysis of participants who completed a RR programme between 2005 and 2017 was performed. 155 participants performed physical function and exercise capacity outcome measures (incremental shuttle walk test (ISWT), a measure of cardiopulmonary fitness, Sit to stand 60 (STS-60) a functional muscle endurance test, The Timed Up and Go test (TUAG) a test of gait speed and balance, reported hardest daily task (RPEHDT) a self-reported measure of hardest daily activity, the Duke Activity Status index (DASI), a self-reported physical function questionnaire and the Hospital Anxiety and Depression scale (HAD-A & HAD-D) a measure of mood and anxiety at baseline (pre-rehab), 12 weeks (post-rehab) and 1 year (long-term follow up). The RR programme comprised of twice-weekly supervised group exercise, combining aerobic and resistance exercise training with education. Student paired *t*-test analyses were used to investigate differences in outcome measures at the three time points (baseline, 12 weeks and 1 year).

**Results:** 155 participants (58±12years, male n=87, haemodialysis n=36, kidney transplant n=40, peritoneal dialysis n=9, non-dialysis CKD n= 67) completed the programme and had 1-year follow-up data. Paired sample *t*-tests from baseline (pre-rehab) to 12 weeks (post-rehab) revealed significant mean differences in all functional outcome measures; ISWT (-109±142.85 meters, *t*=-9.27, *p*<0.0005), TUAG (1.89±2.70 seconds, *t*=8.71, *p*<0.0005), SCD (6.98±13.22seconds, *t*=6.31, *p*<0.0005), STS60 (-4.80±6.2 reps, *t*=-9.67, *p*<0.0005), RPEHDT (1.78±1.88score, *t*=11.52, *p*<0.0005), DASI (-7.01±10.51 score, *t*=-8.28, *p*<0.0005), HAD-A (0.69±3.28score, *t*=2.58, *p*=0.01) and HAD-D (1.52±3.05 score, *t*=6.08, *p*<0.0005). On evaluation of the long-term outcome data (12 weeks to 1 year), there were significant mean differences only in TUAG (-0.84±1.71seconds, *t*=-2.94, *p*<0.006) and SCD-3.49±9.03, *t*=-2.19, *p*=0.03). When comparing the 1 year long-term outcome data with the baseline values, there were significant mean differences in ISWT (-96.69±184.48meters, *t*=-3.14, *p*=0.03), TUAG (1.09±3.03seconds, *t*=2.14, *p*=0.04), STS60 (-3.22±9.19reps, *t*=-2.10, *p*=0.04), RPEHDT (1.5±2.26score, *t*=3.98, *p*<0.0005), DASI (-5.10±9.51score, *t*=-3.22, *p*=0.003) and HAD-D (1.85±3.63score, *t*=3.01, *p*<0.005).

**Relevance and conclusion:** The results suggest that completing a 12-week RR programme can result in significant improvements in all functional outcome measures. On comparison of 1-year data with baseline values, significant improvements in all outcome measures are apparent. When comparing post-rehab data with 1-year values, only a significant decline in TUAG and SCD can be seen. These results suggest that a 12-week RR programme can achieve long-term exercise capacity and physical function gains, but suggest that further intervention may be necessary to maintain gains in coordination and stair climb / descent agility.