

## Exercise

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### GUIDELINES

**Exercise training has not been shown to retard the progression of renal insufficiency. (Level II Evidence; single, small, underpowered trial; clinically relevant outcome; negative effect)**

### Background

Chronic kidney disease (CKD) is typically associated with sarcopenia and a reduction in exercise tolerance. In rat models of CKD, augmented exercise has been shown to be renoprotective (Kohzaki et al 2001). The objective of this guideline is to assess the available clinical trials of the effects of enhanced physical activity on renal function decline in patients with CKD.

### Search strategy

**Databases searched:** Medline (1999 to November Week 2, 2003). MeSH terms for kidney disease were combined with MeSH terms and text words for exercise training. The results were then combined with the Cochrane highly sensitive search strategy for randomised controlled trials and MeSH terms and text words for identifying meta-analyses and systematic reviews. The Cochrane Renal Group Specialised Register of Randomised Controlled Trials was also searched for relevant trials not indexed by Medline.

**Date of search:** 16 December 2003.

### What is the evidence?

There is one randomised controlled trial (RCT).

Eidemak et al (1997) randomised 30 patients with moderate-to-severe CKD (median GFR 25 mL/min/1.73 m<sup>2</sup>, range 10–43) to physical training (30 minutes of bicycling daily or an equal amount of other physical activities) or to maintenance of usual lifestyle. Over a median follow-up time of 20 months, median maximal work capacity increased significantly in the exercise group, but not in the controls. However, no change in GFR decline was observed between the 2 groups. The chief limitation of the study was its lack of statistical power.

A small prospective, non-controlled study of 16 subjects with CKD (Castaneda et al 1998) showed no effect of endurance exercise training (cycle ergometer) on renal function, as determined by plasma creatinine. The major limitations of the study were its small numbers, short follow-up time, high drop-out rate (50%) and inappropriate measure of renal function.

## **Summary of the evidence**

There has only been one small, underpowered RCT of intensive exercise vs usual lifestyle in 30 patients with stages 3–5 CKD. After a median follow-up of 20 months, no significant change in GFR decline was observed between the 2 groups, although a type 2 statistical error is likely.

## **What do the other guidelines say?**

**Kidney Disease Outcomes Quality Initiative:** No recommendation.

**UK Renal Association:** No recommendation.

**Canadian Society of Nephrology:** No recommendation.

**European Best Practice Guidelines:** No recommendation.

**International Guidelines:** No recommendation.

## **Implementation and audit**

No recommendation

## **Suggestions for future research**

A larger, longer-term study of the effects of exercise on renal failure progression is warranted.

## **References**

Castaneda C, Grossi L, Dwyer J. Potential benefits of resistance exercise training on nutritional status in renal failure. *J Ren Nutr* 1998; 8: 2–10.

Eidemak I, Haaber AB, Feldt Rasmussen B et al. Exercise training and the progression of chronic renal failure. *Nephron* 1997; 75: 36–40.

Kohzuki M, Kamimoto M, Wu XM et al. Renal protective effects of chronic exercise and antihypertensive therapy in hypertensive rats with chronic renal failure. *J Hypertens* 2001; 19: 1877–82.

## Appendices

**Table 1 – Characteristics of included studies**

Study ID (author, year)	N	Study Design	Setting	Participants	Intervention (experimental group)	Intervention (control group)	Follow up (months)	Comments
Eidemak I et al, 1997	30	Prospective, randomised, controlled trial	Hospital	30 non-diabetic patients aged 22–70yrs with moderate progressive CKD and a median GFR of 25 mL/min/1.73 m <sup>2</sup>	Exercise program designed to match patient's physical capacity. Exercises consisted of bicycle ergometer exercise, running, swimming and walking. Duration and intensity of exercise gradually increased over time.	No exercise program	Minimum of 18	

**Table 2 – Quality of randomised trials**

Study ID (author, year)	Method of allocation concealment	Blinding			Intention-to-treat analysis	Loss to follow up (%)
		(participants)	(investigators)	(outcome assessors)		
Eidemak I et al, 1997	Central	No	No	No	Unclear	Unclear