

05: PHYSICAL ACTIVITY AND CHRONIC KIDNEY DISEASE (CKD)

CKD This term describes a group of progressive and irreversible kidney disorders which are estimated to affect around 8% of the population in the UK.¹

A progressive decline of renal function is associated with:

- Increasing morbidity and mortality
- Muscle wasting
- Anaemia
- Systemic inflammation
- Metabolic co-morbidities, including type II diabetes and obesity²

A minority of patients will eventually progress to end stage renal failure (ESRF) requiring dialysis or transplantation, but **by far the most common cause of death is cardiovascular disease (CVD)**.²

Patients with CKD^{3,4} display poor physical fitness and reduced exercise capacity, which is directly associated with all-cause mortality⁵. Physical activity levels vary amongst CKD populations, with ~40% of non-ESRF patients being physically active, however levels decrease with disease progression and are lowest amongst ESRF patients receiving dialysis⁶. However, higher levels of leisure time physical activity and walking are associated with slower decline in kidney function, reduced risk of renal replacement therapy and mortality^{7,8}.

The use of exercise in the treatment and rehabilitation of such patients is relatively understudied, but there is now sufficient evidence of the benefits for exercise to be mentioned in the current NICE guidelines for the management of CKD:

NICE guidelines CG182⁹ on Chronic kidney disease in adults recommend:

- Encourage people with CKD to take exercise, achieve a healthy weight and stop smoking. (2008)

The American National Kidney Foundation guidelines include a similar statement encouraging exercise, weight loss and smoking cessation in CKD; however, these current guidelines lack specific advice for exercise and physical activity prescription. Greater information is provided in the 2012 American Kidney Disease Improving Global Outcomes (KDIGO)¹⁰ guideline for the management of blood pressure, who advocate performing exercise “compatible with cardiovascular health and tolerance, aiming for at least 30 minutes 5 times per week”. Whilst current clinical guidelines for exercise in the management of CKD patients in the UK are lacking, more in-depth guidelines are included in the Swedish handbook Physical Activity in the Prevention and Treatment of Disease (FYSS in Swedish).¹¹

Benefits of exercise in CKD:

Data coming from a number of systematic reviews and/or meta-analyses¹²⁻¹⁶ and randomised controlled trials and experimental studies¹⁷⁻²² into the effects of exercise across the spectrum of CKD report the following benefits:

- Significant positive effects on exercise capacity following all types of exercise including, aerobic and resistance exercise performed individually or in combination
- Increased walking capacity
- Significant positive effects of cardio-protective benefits and reduction of cardiovascular risk factors including blood pressure control in non-ESRF CKD following aerobic exercise
- Reversal of CKD related muscle wasting with improvements in muscle size and strength with progressive resistance exercise
- Improved health related quality of life following aerobic and resistance exercise performed individually or in common
- Reductions in systemic inflammation and circulating markers of oxidative stress (malondialdehyde and 4-hydroxyalkenals) following aerobic exercise

As a result, both aerobic and resistance exercise are recommended due to their separate beneficial effects on cardiovascular health and skeletal muscle in these patients,^{23,24} who typically lead sedentary lifestyles²⁵.

Precautions:

The usual **absolute contraindications** to exercise apply in CKD

The following can be considered CKD specific precautions and contraindications^{6, 13, 24, 26, 27}:

- With the high prevalence of CVD the patient should have no or stable angina, well controlled blood pressure and minimal fluid retention.
- Patients with CKD are prone to fragility fractures and tendinoses injuries with spontaneous tendon ruptures being reported in CKD. Moreover, musculoskeletal and joint issues are likely to be a common consequence of the initiation of exercise training due to the high prevalence of co-morbidities in most CKD patients. Therefore flexibility and stretching exercises along with a long warm up and cool down period should be incorporated into a graded exposure to exercise.
- Patients with polycystic disease kidneys and those with a kidney transplant should avoid high impact exercises due to the risk of mechanical injury to their kidneys.
- Patients with a fistula can exercise their fistula arm, but should not apply weight to that area

CKD specific contraindications

1. Electrolyte abnormalities – especially hypo/hyperkalaemia
2. Recent ECG changes – especially symptomatic tachyarrhythmias or brady-arrhythmias
3. Excess inter-dialytic weight gain >4kg since last dialysis session
4. Unstable dialysis treatment and titrating medication
5. Pulmonary congestion
6. Peripheral oedema



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Although it is important to recognise the precautions, it is equally important to bear in mind that in the absence of absolute contraindications to exercise, sedentary behaviour probably carries more health risks than performing regular physical activity at an appropriate moderate intensity.²⁸

Patients should be advised to incorporate increased physical activity into their lifestyle wherever possible, gradually increasing the intensity and duration.²⁹ To gain greater improvements in aerobic capacity and muscle size and strength, patients should be encouraged to progress to moderate intensity, but the primary aim is to establish a sustained habit of regular physical activity. Setting unrealistic targets is

counterproductive as the patient is unlikely to engage with a programme if they lack confidence and belief in their ability to succeed, and failure is extremely demotivating. Therefore, to effectively initiate and maintain exercise behaviour it is important to work with the patient and help them to:

- understand the potential benefits of exercise in the context of their own health and lifestyle
- identify attainable goals that are meaningful and appropriate to the individual
- formulate a realistic plan of action and consider ways to manage potential barriers
- monitor progress and recognise improvements

Key message:

Exercise has a number of benefits for individuals with CKD and should be used as an adjunct to treatment to manage and improve many of the disease related co-morbidities.

Consider:

1. Auditing your CKD patients to see if they are currently engaging in exercise or physical activity.
2. Advise on diagnosis and reviews of the importance of this lifestyle approach for their own well-being.

Benefits to health professionals:

Reduced healthcare costs, including falls, and loss of independence. As CKD patients are prone to muscle loss and weakness, preservation of physical function is of particular importance and relevance, and appropriate exercise therefore has the potential for reduced morbidity and associated cost savings.

Signpost patients to:

National Kidney Federation at

<http://www.kidney.org.uk/help-and-info/medical-information-from-the-nkf-/medical-info-other-keepfit/>

Or Kidney Research UK at

<https://www.kidneyresearchuk.org/health-information/exercising>

Extracted from the Wales HEIW CPD module on physical activity *Motivate2Move*. Now part of the RCGP Clinical Priority on physical activity and lifestyle. Review date Dec 2022

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