

[Test Your Knowledge: Exercise Nephrology Region](#)

[NephMadness 2019](#) featured the [Exercise Nephrology](#) region. What's different about exercise in patients on dialysis vs those with transplants? How do we treat exercise- vs substance-associated nephrotoxicity? Test your knowledge on exercise nephrology with the quiz* below.

1. A 45-year-old woman with ESKD from hypertension on in-center hemodialysis would like to start an exercise regimen to become healthier. You advise that an exercise program done during dialysis compared to exercise between dialysis sessions is more likely to result in which of the following?
 - A. Increased peak oxygen consumption
 - B. Decreased likelihood of dropping out
 - C. Improved exercise time
 - D. Improved perception of health

2. A 27-year-old woman who underwent a living related kidney transplant 2 years ago asks you if she can start a supervised exercise program. Which of the following is likely to occur with initiating an exercise program?
 - A. Improved allograft function
 - B. Worsened allograft function
 - C. Improved quality of life
 - D. Worsened VO₂ max

3. A 27-year-old Caucasian man presents to the ER with one day of tea colored urine after starting a new weight lifting regimen 2 days ago. A diagnosis of rhabdomyolysis is made after lab tests showed a CPK of 75,000 IU/L. He reports that he has previously had rhabdomyolysis twice before, once in high school and once in college, when starting exercise regimens, so he has generally avoided exercise. With both of these episodes he was treated with intravenous fluids and muscle rest with no long-term sequelae. In addition to starting appropriate treatment for his rhabdomyolysis, what other testing should be considered?
 - A. Screen for an underlying genetic muscle disorder
 - B. Echocardiogram
 - C. Renal ultrasound with dopplers
 - D. Angiogram of bilateral lower legs

4. A 25-year-old male bodybuilder presents for nephrologic evaluation after being found to have an elevated creatinine of 1.8 mg/dL on routine screening. He has no past medical problems. His blood pressure is 125/76 mm Hg with heart rate of 78 beats per minute. His exam is unremarkable. He uses anabolic steroids daily. The remainder of his labs show 1 gram of proteinuria/24 hours and no hematuria. A kidney biopsy is most likely to show which of the following?
- A. Bile acid nephropathy
 - B. Acute interstitial nephritis
 - C. Focal segmental glomerulosclerosis
 - D. Minimal change disease

- Quiz prepared by [Anna Burgner](#), NephMadness Executive Team and AJKD Social Media Advisory Group Member. Follow her [@anna_burgner](#).

To view the full [Exercise Nephrology](#) region (FREE), please visit [AJKDBlog.org](#).

Title: [Exercise Nephrology](#)

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*This quiz was originally featured in the MOC Post-Test Questions for NephMadness 2019.

[Answers to Test Your Knowledge: Exercise Nephrology](#)

1. B. Decreased likelihood of dropping out

The study cited compared intradialytic to interdialytic training programs in hemodialysis patients. The intradialytic training program was associated with less drop out from the study. Otherwise the interdialytic training program was associated with larger increase in peak oxygen consumption, improved exercise, and improved perception of health.

Reference: Kouidi, E., Grekas, D., Deligiannis, A., and Tourkantonis, A. Outcomes of long-term exercise training in dialysis patients: comparison of two training programs. *Clin Nephrol* 2004 May; 61 Suppl 1: S31-8.

2. C. Improved quality of life

A recent meta-analysis and systematic review showed that exercise training in kidney transplant patients improved quality of life and VO₂ max without having any effect on allograft function.

Reference: Oguchi, H., Tsujita, M., Yazawa, M., et al. The efficacy of exercise training in kidney transplant recipients: a meta-analysis and systematic review. *Clin Exp Nephrol* 2019; 23(2): 275-84.

3. A. Screen for an underlying genetic muscle disorder

Repeated episodes of exertional rhabdomyolysis should raise the suspicion of an underlying disorder like a genetic muscle disorder such as type 1 ryanodine receptor related conditions.

Reference: Scalco, R. S., Snoeck, M., Quinlivan, R., et al. Exertional rhabdomyolysis: physiological response or manifestation of an underlying myopathy? *BMJ Open Sport Exerc Med* 2016; 2(1): e000151.

4. A. Bile acid nephropathy

There have been many multiple different mechanisms of injury from anabolic steroids including a secondary FSGS from postadaptive glomerular changes, bile cast nephropathy, and ATN. His presentation is most consistent with FSGS.

Reference: Herlitz, L.C., Markowitz, G.S., Farris, A.B., et al. Development of focal segmental glomerulosclerosis after anabolic steroid abuse. *J Am Soc Nephrol* 2010; 21(1): 163–72.

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