

**Polski Paweł, Alzubedi Adam, Kusz Monika, Rudzki Sławomir. Physical activity after kidney transplant. Journal of Education, Health and Sport. 2018;8(11):11-17. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.1464950>
<http://ojs.ukw.edu.pl/index.php/johs/article/view/6199>**

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

© The Authors 2018;

This article is published with open access at Licensee Open Journal Systems of Kazimierz Wielki University in Bydgoszcz, Poland
Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike.
(<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 22.09.2018. Revised: 28.09.2018. Accepted: 13.10.2018.

Physical activity after kidney transplant

Paweł Polski¹, Adam Alzubedi¹, Monika Kusz², Sławomir Rudzki¹

1. Department of General and Transplant Surgery and Nutritional Treatment, Medical University of Lublin.

2. Department of Pediatric Nephrology, Medical University of Lublin.

Address for correspondence:

Paweł Polski, Department of General and Transplant Surgery and Nutritional Treatment, Medical University of Lublin, 8 Jaczewskiego St, 20-954 Lublin, Poland, phone: +48 514 746 457, e-mail: maestro532@wp.pl

Abstract:

Chronic kidney disease is currently included in one of the civilization diseases. From year to year, the number of people suffering from this disease is systematically increasing. It is estimated that it affects about 30% of people over 60 years of age. Below this age, the number of patients is over 150 people with a million population. The increase in the number of cases is closely related to the change in the mode and pace of life in the modern world. Diabetes and hypertension are considered to be the main causes of kidney disease. Another point are glomerulonephritis. Chronic kidney disease is a progressive disease, and treatment is mainly based on slowing the pace of its progression or preventing complications. We distinguish three main methods of renal replacement therapy: peritoneal dialysis, hemodialysis and kidney transplantation. The first two methods prevent the occurrence of complications of kidney disease. However, they do not constitute a causal treatment. Renal replacement therapy is a significant burden for the patient. It involves many sacrifices and limitations in everyday functioning. Patients are forced to visit hemodialysis stations several times a week, which provides them with fairly average career and leisure opportunities. Currently considered the best method of combating chronic kidney disease is transplantation. Patients after kidney transplantation are able to return to life in a short period of time training. Also, the number of restrictions related to practicing sports is significantly reduced. The only obligation for patients after kidney transplantation is the regular intake of immunosuppressive drugs and controls in transplantation outpatient departments. This publication aims to present the possibilities and limitations for patients who want to actively rest and play sports

Keywords: kidney transplant, recipient, exercise, physical activity

Introduction:

In recent years, the number of kidney transplants per year has increased significantly. It is depends on better social education and the development of medicine allowing the implantation of organs to elderly people and those burdened with various chronic diseases. The main cause of post-transplant kidney mortality is cardiovascular disease (1). More than 65% of patients after transplantation are overweight (2, 3, 4). Corticosteroids used in immunosuppression can cause many unwanted effects such as osteoporosis, diabetes, and muscle damage. (5,6,7). The benefits of daily physical activity are known not from today. Healthy people actively doing sports better tolerate stress at work and in contacts with people. They are less likely to fall into depression and addictions and are much more likely to be involved in social life. Regular activity reduces the risk of death due to cardiovascular diseases, improves blood pressure control, maintains the proper structure and function of the

muscles and prevents osteoporosis. It relieves the symptoms of depression and anxiety and improves well-being. (8). Studies show that patients after kidney transplant physically active have better performance, blood pressure control, bone metabolism, and better kidney function of the transplanted kidney. (9,10,11). The most often practiced sports disciplines by persons after kidney transplantation are: cycling, fitness, jogging, skiing, swimming, Nordic walking, gym, football).

Sport before kidney transplant:

People with chronic renal failure are usually qualified for kidney transplantation in stage IV of the disease. Usually, they are already included in the peritoneal dialysis or hemodialysis program. Such treatment significantly limits the possibilities of active spend time by patients. Sedentary lifestyle. A diet low in vegetables usually leads to weight gain and development of obesity (12). Obese patients have a much higher risk of development atherosclerosis and cardiovascular diseases. Consequently, the function of the transplanted kidney is impaired (13). The education of patients eligible for transplant should be aware that the limitations associated with hemodialysis should not lead to a complete transition to a sedentary lifestyle.

Effects on blood pressure:

Patients with chronic kidney disease in 95% have problem with control of blood pressure. This is due to disturbances in the functioning of the RAA system. After the transplant, the pressure fluctuations are reduced, however, patients still require hyponetical treatment. It has been confirmed that regular physical activity helps normalize blood pressure and reduces the need for antihypertensive drugs. (14,15)

Effects on metabolism:

The use of corticosteroids, a sedentary lifestyle is also associated with the risk of developing diabetes, osteoporosis and depression in patients afflicted with chronic kidney disease. The development of undesirable treatment with steroids forces the introduction of more and more drugs taken by patients, which may aggravate the anxiety and development of depressive disorders. Therefore, it is important to find the optimal means to prevent these complications. Improvement of insulin resistance, reduced bone metabolism as well as better

tolerance of stress are associated with any type of physical activity. However, it is important that it is regular. (16,17).

Guidelines for conducting strength training:

After analyzing the available materials, it can be concluded that patients after kidney transplantation should seek to return physical activity from the period before chronic kidney disease. The important thing when starting the exercise is to keep an appropriate time limit from the surgical operation. Too early start of strength exercises may be a potential cause of a postoperative hernia. Therefore, initially patients should start with exercises improving the efficiency of the body in a small but progressive degree (18). People who have received a transplant after several years of hemodialysis have significantly lower muscle mass and therefore their return to full efficiency will last much longer. Similarly to older people with an increased fragility index (19,20). Cycling, swimming, nordic walking and jogging should, to a large extent, be a daily portion of physical activity. To improve the function of the transplanted kidney and to minimize the side effects of the medicines used, 30 min a day of moderate physical activity is usually sufficient. (21, 22).

Strength exercises to develop muscle mass should be carried out initially under constant control of the transplanted kidney parameters. Muscle work with associated light damage associated with anaerobic metabolism causes an increase in serum creatinine, which should be filtered through a transplanted kidney. Excessive creatinine in the plasma can lead to worsening dysfunction and the resultant organ loss. Therefore, it is important to assess the function of the kidney before starting strength exercises. The position of the kidney after transplantation in the ilium and vascular anastomoses with the iliac vessels also introduce certain limitations. They are associated with the likelihood of pressure on vessels with a long sitting position. Therefore, it is recommended that patients change their exercises frequently and regular interlaces of strength and endurance exercises, which will prevent excessive pressure on the vessels (23). An additional limitation are contact sports. Patients after transplantation do not have an absolute injunction on practicing contact sports as football. (24,25). However, special attention should be paid to the rather superficial location of the transplanted kidney, and thus the ease of its mechanical damage. Patients practicing such sports should be instructed about increased attention and protection of the organ. Research confirms that some patients have returned to professional football. Conditionally and in performance they were not different from fully healthy players (25).

Contraindications:

People after kidney transplants who want to return to full training should be subjected to a detailed assessment of specialists in other fields of medicine. The cardiac and pulmonary

evaluation is of crucial importance. Diseases such as unstable angina, pulmonary hypertension, heart failure, severe valve defects, and aortic aneurysm can be an absolute contraindication to practicing sports to the extent that a patient would like it. Also, the evaluation of a neurologist, endocrinologist and ophthalmologist may cause some limitations in practicing daily activities (26).

Summary:

The physical activity recommended above applies mainly to both young and adult patients after kidney transplantation. The limitations that can be applied concern mainly coexisting diseases, in which excessive physical effort would give the opposite effects from the intended one. That is why every patient intending to return to sport should consult their physician about possible limitations of effort. Exercises and the increase in physical activity after transfusion allow patients to return to working life and facilitate social interactions. Additionally, the applied diet allows patients after transplantation to function in society for many years as well as healthy people.

References:

1. Kahwaji J., Bunnapradist S., Hsu J.W., Idroos M.L., Dudek R. (2011). Cause of death with graft function among renal transplant recipients in an integrated healthcare system. *Transplantation*; 91: 225–230.
2. Jezior D., Krajewska M., Madziarska K. i wsp. (2007). Posttransplant overweight and obesity: myth or reality? *Transplant. Proc.* 39: 2772–2775.
3. Greenwood, S. A.; Koufaki, P.; Mercer, T. H.; Rush, R.; Connor, E. O.; Tuffnell, R.; Lindup, H.; Haggis, L.; Dew, T.; Abdalnassir, L.; Nugent, E. (2015) Aerobic or Resistance Training and Pulse Wave Velocity in Kidney Transplant Recipients: A 12-Week Pilot Randomized Controlled Trial (the Exercise in Renal Transplant [ExeRT] Trial). *Am. J. Kidney Dis.* doi:10.1053/j.ajkd.2015.06.016.
4. Zelle D.M., Kok, T., Ml, D., Ei, D., Navis, G., & Wj, V. S. (2013). The role of diet and physical activity in post-transplant weight gain after renal transplantation. *Clinical Transplantation* 2013; 484–490. <https://doi.org/10.1111/ctr.12149>
5. Cordier P., Decruynaere C., Devogelaer J.P. (2000). Bone mineral density in posttransplantation patients: effects of physical activity. *Transplant. Proc.* 32: 411–414
6. Grotz W.H., Mundinger F.A., Rasenack J. i wsp. (1995). Bone loss after kidney transplantation: a longitudinal study in 115 graft recipients. *Nephrol. Dial. Transplant.*10: 2096–2100.

7. Yanishi, M., Kimura, Y., Tsukaguchi, H., Koito, Y., Taniguchi, H., Mishima, T., ... Matsuda, T. (2017). Factors Associated With the Development of Sarcopenia in Kidney Transplant Recipients. *Transplantation Proceedings*, 49(2), 288–292.
8. Office of the US Surgeon General, Physical Activity and Health. A report of the Surgeon General, 1996; US Department of Health and Human Services, Public Health Service
9. Painter P.L., Hector L., Ray K. i wsp. (2002). A randomized trial of exercise training after renal transplantation. *Transplantation*; 74: 42–48.
10. Kempeneers G., Myburgh K.H., Wiggins T. i wsp. (1990). Skeletal muscle factors limiting exercise tolerance of renal transplant patients: effects of a graded exercise training program. *Am. J. Kidney Dis.* 14: 57.
11. Miller T.D., Squires R.W., Gau G.T., Frohnert P.P., Sterioff S.(1987). Graded exercise testing and training after renal transplantation: a preliminary study. *Mayo Clin. Proc.* 62: 773–777.
12. Lorenz, E. C., Cheville, A. L., Amer, H., Kotajarvi, B. R., Stegall, M. D., Petterson, T. M., LeBrasseur, N. K. (2017). Relationship between pre-transplant physical function and outcomes after kidney transplant. *Clinical Transplantation*, 31(5), [e12952]. DOI: 10.1111/ctr.12952
13. Cheng, Xingxing S.; Myers, Jonathan N.; Chertow, Glenn M.; Rabki – (2017). Prehabilitation for Kidney Transplant Candidates- Is it Time. *Clinical Transplantation* Aug;31(8). doi: 10.1111/ctr.13020
14. Kelley GA, Kelley KS. (2000). Progressive Resistance Exercise and Resting Blood Pressure : A Meta-Analysis of Randomized Controlled Trials . Vol. 35, *Hypertension* . P. 838-43.
15. Martel GF, Hurlbut DE, Lott ME, Lemmer JT, Ivey FM, Roth SM, et al. (1999). Strength training normalizes resting blood pressure in 65- to 73-year- old men and women with high normal blood pressure. *J Am Geriatr Soc.* 47(10):1215–21
16. Westcott WL. (2012) Resistance Training Medicine: Effects of strength training on health. *Am Coll Sport Med.* 11(4): 209-16.
17. Dolezal BA, Potteiger JA, Brett A, Concurrent JAP. (2007). Concurrent resistance and endurance training influence basal metabolic rate in nondieting individuals. 695-700.
18. Bellizzi, Vincenzo; Cupisti, Adamasco; Capitanini, Alessandro; C. (2014). Physical Activity and Renal Transplantation. *Kidney Blood Press Res.* 39(2-3):212-9. doi: 10.1159/000355799
19. Hernández Sánchez, Sonsoles; Carrero, Juan J.; García López, (2016). Forma física y calidad de vida en pacientes trasplantados de riñ. *Medicina Clínica*. [doi 10.1016%2Fj.medcli.2016.01.017].
20. McAdams-DeMarco, M. A., Ying, H., Olorundare, I., King, E. A., Haugen, C., Buta, B., ... Segev, D. L. (2016). Individual Frailty Components and Mortality In Kidney Transplant Recipients. *Transplantation*. DOI: 10.1097/TP.0000000000001546

21. Raymond, J.; Johnson, S.T.; Diehl-Jones, W.; Vallance, J.K. (2016) Walking, Sedentary Time and Health-Related. *Transplant Proc.* Jan-Feb;48(1):59-64. doi: 10.1016/j.transproceed.2015.12.022.
22. Kastelz, Alexandra; Tzvetanov, Ivo G.; Fernhall, Bo; Shetty, Ane. (2015). Experimental protocol of a randomized controlled. *Contemp Clin Trials.* Mar;41:280-6. doi: 10.1016/j.cct.2015.02.003
23. Mazzoni, D.; Cicognani, E.; Mosconi, G.; Totti, V.; Roi, G.S.; T. (2014). Sport activity and health-related quality of life after kidney transplantation. *Transplant Proc.* Sep;46(7):2231-4. doi: 10.1016/j.transproceed.2014.07.049
24. Totti, V.; Zancanaro, M.; Trerotola, M.; Nanni Costa, A.; Antone. (2013). Quality of Life and Energy Expenditure. *Transplant Proc.* Sep;45(7):2758-60. doi: 10.1016/j.transproceed.2013.07.027
25. Kowal G., Bidas K. (2014). Bieganie jako forma aktywności fizycznej u pacjenta po przeszczepie nerki – opis przypadku klinicznego. *Forum Nefrologiczne*, tom 7, nr 4, 249–253
26. Williams MA, Haskell WL, Ades PA, Amsterdam EA, Bittner V, Franklin BA, et al. (2007) Resistance exercise in individuals with and without cardiovascular disease: 2007 update: a scientific statement from the American Heart Association Council on Clinical Cardiology and Council on Nutrition, Physical Activity, and Metabolism. *Circulation.*