

## The Influence of Sports Therapy and Physical Capability on Morbidity and Quality of Life of Patients with Chronic Renal Failure

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Patients with a chronic renal failure show a considerably increased morbidity and mortality. Dialysis patients only have 17 % to 39 % of the life expectancy compared to the general population. The cause is in particular a massively increased cardiovascular risk which is responsible for 50 % of all deaths in dialysis patients. Correspondingly large is the influence of cardiovascular diseases and their consequences like myocardial infarction, amputation or apoplexy on the morbidity of chronic renal insufficiency patients. Besides the consequences of a chronic uremia and the dialysis treatment, mainly these diseases have a negative influence on the quality of life of dialysis patients.

### Sport therapy for reduction of the cardiovascular risk

Reducing the cardiovascular risk should be one of the main goals of the medical treatment of patients with chronic renal failure. Besides a good dialysis quality, a low calcium phosphate product and the corresponding medication, sport therapy is a promising approach for dialysis patients. Numerous studies – which, however have not been performed with chronic renal insufficiency patients – show that sport therapy improves the myocardial perfusion and reduces cardiovascular mortality in coronary heart diseases. Patients with peripheral arterial obstructive disease showed improvements in their walking distance of 100-150%. The

mortality in patients with chronic heart failure could be reduced. Furthermore is shown that sport therapy reduces the apoplexy risk as well as improves the diabetes and hypertension management.

### Sport therapy during dialysis

Patients with chronic renal failure, in particular also dialysis patients, frequently have a lower motivation and a limited capability. On the other side dialysis treatment offers the best opportunity for a structured physical training: The patients can be motivated, trained by a corresponding qualified person and observed during the training.

Several studies show that sport during dialysis treatment improves the physical capability. However the examined patient groups were mostly small and the training period short.

The physical capability of dialysis patients is very different, older patients or amputees have other training requirements than a 20 year old patient with cystic kidneys. However, the patients have to train effectively at their personal performance limit in order to achieve positive influences on the endothelins. Therefore the training design has to be individual by patient and adjusted to the personal physical capability.

### Results of a structured performance controlled training during dialysis



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For one year a structured performance controlled training was performed with a part of our patients at our dialysis center. The aim of our study was that every patient trains according to the personal performance level while improving the individual performance continuously.

A combination of dynamic strength training and endurance exercise was used. The study included 46 patients. All patients did twice a week 30 minutes dynamic strengthening training and 30 minutes endurance training during the first two hours of the dialysis treatment. 8 different exercises were trained at the dynamic strengthening training. The training controlled by the one-minute-strength test. The endurance training was heart rate controlled, meaning that the maximal heart rate was determined and the training rate was calculated by the Karvonen Formula. The bicycle ergometers (MOTOmed letto2 from the company Reck MOTOmed) which were used for the endurance training allowed a heart rate controlled training and patient-specific storage of the training data. The intensity of the training has been increased continuously.

After 12 months of training the strength of the differently trained muscle groups of the patients increased on average about 78 %. The work per training session which was

performed during the endurance training increased on average about 35%, the average performance per training about 31%. Due to the different conditions of the patients the individual process varied strongly. In the end of the study the participants and also the not participating patients were asked to evaluate their current quality of life by the SF-36-questionnaire. The participating patients had better results in all categories, especially the values of the physical capability were significantly different.

The study of our dialysis center shows that individual and structured performance controlled endurance and strengthening training can be successfully applied in dialysis patients.

That provides the preconditions for decreasing the cardiovascular risk in dialysis patients by sports therapy. Multicenter studies would be preferable for further investigations.

The gained improvements in strength and endurance decrease morbidity (fall prevention) and improve quality of life of the patients.

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