

Physical exercise and chronic kidney disease

Exercício físico e a doença renal crônica

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Chronic kidney disease (CKD) is characterized by the slow, progressive and irreversible loss of blood clearance capacity by the kidneys [1]. Classified into 5 stages (in which the last one requires replacement therapy - hemodialysis) [2], CKD affects about 850 million people in the world, being responsible for approximately 2.4 million deaths per year [1].

Several studies point to the importance of physical exercise in the quality of life, in the clinical and functional conditions of this population [3,4]. According to the Brazilian Guideline for Cardiovascular Rehabilitation [5], when correctly prescribed, physical exercise is an important ally for the control of hypertension, systemic arterial disease, diabetes mellitus and cardiovascular diseases, considered as the main risk factors for the onset of CKD [5,6].

However, there is still no consensus in the scientific literature on the frequency, intensity, type and duration of exercise for CKD to be performed safely, taking into account the stages of the disease. It is known that in the initial stages, individuals do not present the signs and symptoms of the disease, thus, clinical follow-up and routine examinations are essential [1,2,4]. In this case, physical exercises can be prescribed aiming at the control of risk factors, with intensity above 85% of HRmax, similarly to those described in the guidelines [5]. Thus, we suggest: continuous high-intensity or moderate-intensity cyclic exercises aiming at cardiovascular and metabolic conditioning; and neuromuscular, promoting the maintenance of muscle strength and endurance.

In the intermediate stage (stage 4), the behavior of the glomerular filtration rate (GFR) should be observed in order to determine the need for hemodialysis [1]. At this stage, the individual already presents some classic signs

and symptoms of CKD. In this case, the professional responsible for prescribing the exercise can initiate the care protocol aiming at physical-functional preparation for hemodialysis. That said, we suggest the use of exercises for arterial toning, preparing you for the creation of arteriovenous fistulas [7], caution should be exercised when prescribing high-intensity exercises, due to the metabolic changes required by it. We suggest prescribing moderate-intensity, neuromuscular and functional aerobic exercises similar to the previous stage.

Other studies demonstrate the importance of physical exercise for advanced stage CKD (grade 5) during hemodialysis [3,4]. It is known that at this stage the presence of pain, sarcopenia, reduced cardiorespiratory reserve and reduced quality of life are changes [8]. Thus, physical exercise can delay the onset of these diseases and optimize the individual's overall health condition [9]. It is suggested that physical exercise be performed in the first two hours of hemodialysis due to the high risk of hypotension and hypoglycemia after this period [4]. We also emphasize the care with access for hemodialysis, as there is no technical-scientific basis in the literature for its mobilization during treatment [7]. The proposed aerobic exercises must be of low intensity, taking into account the programming of the dialysis machine (flow, pressure, Kt/V) and the patient's weight before therapy (contraindicated with weights above 4 kg due to overload water), the neuromuscular can be performed in a similar way to the protocols of the previous stages. To date, there is no consensus on the safety of performing physical exercise between hemodialysis days.

The protocols proposed by this team are supported by the experience and clinical observation of professionals by the few studies that discuss the subject and are described in Table I.

Table I – Description of the stages of Chronic Kidney Disease (CKD), objectives and proposed procedures

Internship	Objective	Exercise
1-3	Control of risk factors for disease progression	<ul style="list-style-type: none"> • Time: 150 min per week • Cyclic: <ul style="list-style-type: none"> High intensity <ul style="list-style-type: none"> • HRtraining: 80 – 85% of HRmax in the intense phase • Borg: 15 - 16 • Time: 20 min Moderate intensity <ul style="list-style-type: none"> • HRtraining: 65 – 75% of HRmax in the training phase • Borg: 12 – 14 • Time: 30 min • Neuromuscular: <ul style="list-style-type: none"> Force: <ul style="list-style-type: none"> • Series: 3 - 4 • Repetitions: 6 -8 • Charge: 85% de 1 MR Resistance <ul style="list-style-type: none"> • Series: 2 - 3 • Repetitions: 15 - 20 • Charge: 65% de 1 MR

Table I – Continuation.

Internship	Objective	Exercise
4	Hydroelectrolytic control arterial toning	<ul style="list-style-type: none"> • Time: 150 min per week • Cyclic: <ul style="list-style-type: none"> Moderate intensity <ul style="list-style-type: none"> • HRtraining: 65 – 75% of HRmax in the training phase • Borg: 12 – 14 • Time: 30 min • Neuromuscular: <ul style="list-style-type: none"> Force: <ul style="list-style-type: none"> • Series: 3 - 4 • Repetitions: 6 -8 • Charge: 85% de 1 MR Resistência <ul style="list-style-type: none"> • Series: 2 - 3 • Repetitions: 15 - 20 • Charge: 65% de 1 MR • Arterial tonification with isometry <ul style="list-style-type: none"> • Series: 2 - 3 • Repetitions: 30 repetitions • Intensidade: 100% da preensão palmar • Contraction time: 5 - 7 sec • Functional: <ul style="list-style-type: none"> • SST (3 x 12)
5	Reduce muscle loss Maintain functional capacity Reduce pain	<ul style="list-style-type: none"> • Low-intensity cyclic during hemodialysis: <ul style="list-style-type: none"> • Duration: 30 min • Borg: Up to 10 • HRtraining: < 65% of HRmax • Neuromuscular: <ul style="list-style-type: none"> • Force: <ul style="list-style-type: none"> • Series: 3 - 4 • Repetitions: 6 - 8 • Load: 85% of 1MR • Resistance <ul style="list-style-type: none"> • Series: 2 - 3 • Repetitions: 15 - 20 • Load: 65% of 1 MR

HRmax: maximum heart rate; HRtraining: training heart rate; MR: maximum repetition; SST: sit to stand training

Physical exercise is an important tool for preventing the progress of CKD as well as maintaining the functionality of individuals. Other studies need to be carried out in order to elucidate in the literature which are the indication criteria for exercise, safety, functional markers most indicated for exercise monitoring and the relationship between physical exercise and hemodialysis therapy.

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