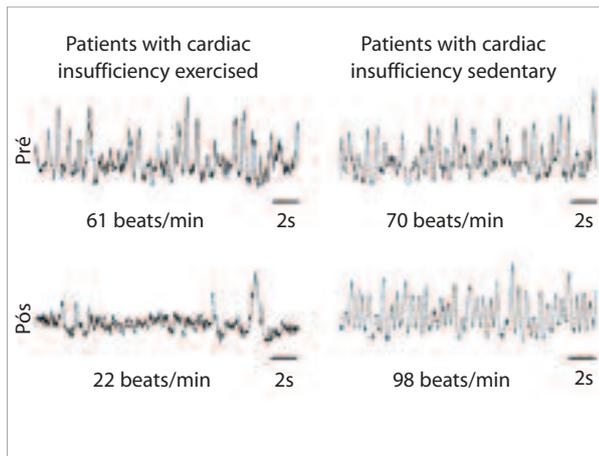


PHYSICAL EXERCISE IN CARDIOVASCULAR PHYSIOPATHOLOGY

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The aim of this thematic project is to investigate the effects of exercise on the cardiovascular physiopathology, which will be accomplished by studies in five subareas of the exercise cardiology and physiology. i) Heart failure and acute coronariopathy. Study of the acute and chronic effects of exercise in a genetic model of heart failure by sympathetic overactivity on the heart and in patients with chronic heart failure, in a clear association between animal and human researches. Our expertise in autonomic control will be also used to study the neurovascular control during the acute phase of the myocardium infarction in humans. ii) Metabolic syndrome. Study of the impact of exercise training associated with hypocaloric diet or hypocaloric diet isolated on the mechanisms underlying the sympathoexcitation in patients with metabolic syndrome. The effects of exercise training and hypocaloric diet on the myocardium calcium transport and, consequently, the ventricular function in obese rats will also be studied. iii) Effects of exercise training on autonomic control in individuals with polymorphism. In order to improve our understanding about genetic influence on the exercise-mediated cardiovascular adaptation, we will study the effects of acute and chronic exercise on cardiac hypertrophy and muscle vasodilatation in individuals with naturally occurring polymorphism in the angiotensin converting enzyme, angiotensinogen B2-adrenoceptors, and endothelial nitric oxide synthase. iv) Cardiac autonomic control in athletes and patients with neurocardiogenic syncope atrial fibrillation. In this area, we will investigate the autonomic adaptations provoked by chronic exercise during different periods of exercise training in athletes. In addition, we will study the effects of exercise training and postural training in patients with neurocardiogenic syncope. Finally, a new approach during electrophysiological study in the treatment of atrial fibrillation will be tested. Exercise training, anabolic steroids and cardiovascular system. In this area, we will study the effects of exercise training associated with anabolic steroids on the cardiac remodeling, coronary blood flow, and cardiac and systemic renin-angiotensin system in rats.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

In the control of arterial hypertension by physical exercise studies, we observed that a single session of physical exercise provokes a reduction in arterial pressure in the post-exercise period in elderly hypertensive patients, which is explained by a decrease in the cardiac deficit as a consequence of improved left ventricle filling. Recently we described how the reduction in arterial pressure is due to the improvement in the arterial baroreflex control, which modulates the sympathetic nervous system.

In the study of the effects of physical exercise on the autonomic control of cardiac insufficiency, we described that the sympathetic nervous system limits the muscular endothelium-dependent vasodilator response in patients with cardiac insufficiency, given that the intra-arterial infusion of phentolamine associated with acetylcholine restores muscular vasodilation during the mental stress of these patients. More recently, we studied the effects of physical training in cardiac and skeletal myopathy provoked by cardiac insufficiency.

In the study where we evaluate the impact of hypercaloric diet and physical exercise in the neurovascular control in obesity, we verified that the vascular function is diminished in obese children (8-12 yo) and that diet associated with physical training, in contrast to diet in isolation, restores the vasodilatory muscular response in these children.

In a recent study, our group described that individuals carrying polymorphism in the codon 27 of the β_2 -adrenergic receptor present increased muscular vasodilatory response during exercise and mental stress when compared to individuals who do not carry this polymorphism. This is the first time that the importance of the genetic mutation of the β_2 -adrenergic receptor which occurs naturally in the population has been shown. In this line of investigation, we also described how obese women with polymorphism in the α_{2B} -adrenergic receptor have alteration in the vagal and sympathetic function during the exercise of hand prehension when compared to women who do not have this polymorphism.

MAIN PUBLICATIONS

Brandão Rondon MU, Alves MJ, Braga AM, Teixeira OT, Barretto AC, Krieger EM, Negrão CE. 2002. Postexercise blood pressure reduction in elderly hypertensive patients. *J Am Coll Cardiol.* **39(4)**: 676-82.

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