

TRAINING PROTOCOL ON CHANGES IN GLYCEMIC LEVELS AND BLOOD PRESSURE IN INDIVIDUALS WITH TYPE 1 DIABETES

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ABSTRACT

Type 1 Diabetes Mellitus (T1DM) is an endocrine condition resulting from the autoimmune destruction of pancreatic beta cells, leading to severe insulin deficiency. Clinically, T1DM manifests with symptoms such as polyuria, polydipsia, xerostomia, unexplained weight loss, fatigue, polyphagia, and blurred vision. Glycemic self-monitoring is a critical process for these patients, allowing the measurement of glucose in different contexts such as home, school, and work environments, and adjusting the insulin dose as needed. According to data from the International Diabetes Federation, in 2019, Brazil ranked fifth globally in terms of diabetes prevalence, with 16.8 million adults affected in the age group of 20 to 79 years. The *American Diabetes Association* recommends that adults with T1DM participate in at least 150 minutes per week of moderate to vigorous intensity physical activities. For children and adolescents with T1DM, the practice of at least 60 minutes daily of physical activities is recommended, including muscle and bone strengthening exercises three times a week. Regular physical activity is associated with a reduction in the risk of future cardiovascular diseases, improved long-term glycemic control, better cardiovascular conditioning, quality of life, reduction in daily insulin needs, and better weight control. Furthermore, it plays a crucial role in the primary and secondary prevention of cardiovascular diseases related to diabetes. This study aims to evaluate the effects of strength training on glycemic parameters after an exercise session in adults with T1DM.

Keywords: diabetes mellitus; training; blood pressure.

INTRODUCTION

Type 1 Diabetes Mellitus (T1DM) is a serious endocrinological condition characterized by severe insulin deficiency, resulting from the autoimmune destruction of pancreatic beta cells. Although often diagnosed in childhood and adolescence, T1DM can manifest at any age. The onset of the disease is usually abrupt and can lead to complications such as ketosis and ketoacidosis, requiring continuous treatment with insulin from diagnosis (LU X., 2020).

It is important to distinguish T1DM from Type 2 Diabetes Mellitus (T2DM), which is characterized by insulin resistance and a partial deficiency in insulin secretion by beta cells. T2DM is often associated with obesity and aging, causing significant metabolic disorders. The differentiation between T1DM and T2DM, although challenging, is crucial and requires a detailed assessment of medical history, physical examination, and laboratory tests (RODACKI, 2022).

Systemic arterial hypertension (SAH), a condition defined by elevated blood pressure levels, is linked to a series of serious complications, including stroke (CVA), myocardial infarction, coronary artery disease, heart and renal failure, contributing

significantly to cardiovascular mortality. Data from DATASUS indicate that in 2017, approximately 1,312,663 deaths from cardiovascular diseases were recorded, with 45% of these cases associated with SAH (MENDES et al., 2017).

In 2019, Brazil was the fifth country with the highest incidence of diabetes globally, with 16.8 million adults affected, and it is projected that this number will reach 21.5 million by 2030 (SANTOS; RODRIGUES 2023). The secretory function of pancreatic beta cells, assessed through C-peptide measurement, is an important marker for the classification of diabetes, as patients with T1DM often present a significant loss in insulin secretion. Furthermore, genetic and environmental factors, such as family history and viral exposures, can influence the risk of developing the disease (SOCIEDADE BRASILEIRA DE DIABETES, 2022).

T1DM presents with symptoms such as polyuria, polydipsia, xerostomia, abrupt weight loss, fatigue, polyphagia, and blurred vision. Lack of adequate treatment can lead to serious complications such as peripheral neuropathy, heart failure, diabetic retinopathy, kidney disease, and dyslipidemia (COCKCROFT, 2019). Hypoglycemia, often resulting from poor treatment adherence or intense physical exercise, is an additional complication to be monitored (ARAÚJO et al., 2019).

The treatment of T1DM involves the administration of insulin for the regulation of glycemic levels, using different forms of insulin based on their onset of action, peak, and duration. Insulin is usually administered via syringes, pens, or insulin pumps (INTERNATIONAL DIABETES FEDERATION, 2020). Self-monitoring of blood glucose is essential for the proper dosing of insulin and should be performed at least four times a day (INTERNATIONAL DIABETES FEDERATION, 2020).

Globally, the prevalence of diabetes has increased substantially, with an estimate of 463 million adults affected in 2020 and 1.1 million children and adolescents under 20 years old with T1DM. Global projections for 2025 were revised to 463 million, evidencing the continuous growth of the disease (MINISTÉRIO DA SAÚDE, 2009).

In Brazil, diabetes ranked third among diseases with the highest morbidity and mortality rates in 2017, with a notable increase in cases among men (SOCIEDADE BRASILEIRA DE DIABETES, 2022). Physical exercise, through the translocation of the GLUT4 receptor, facilitates the entry of glucose into muscle cells, aiding in the reduction of circulating glycemic levels (DEBAT et al., 2018). Furthermore, the regular practice of physical activities can reduce the risk of cardiovascular diseases, improve glycemic control, cardiovascular conditioning and quality of life, in addition to reducing the daily need for insulin and helping with weight control (COCKCROFT, 2019; PEREIRA, 2022).

The present study aims to evaluate the acute effects of strength exercise on blood pressure and glycemic levels in adult individuals with T1DM, using a training protocol approach.

METHODOLOGY

This is a literature review in which the following databases were used: PUBMED, SCIELO and BVS, with the inclusion criteria: patients with T1DM associated with resistance training (physical exercises), clinical trials from the last 10 years, patients of both sexes, age between 25 and 55 years. The exclusion criteria

determined by articles that do not meet the required criteria such as: reviews, year of publication, dissertations that do not address the topic, that do not use patients with T1DM, and having other associated pathologies.

CONCLUSION

It is widely recognized that strength training induces significant organic adaptations in its practitioners, especially in individuals with T1DM. There are still gaps in knowledge, and more studies are needed, both with trained and untrained individuals, to investigate the hypotensive effects. Furthermore, it is important to carry out pharmacological and nutritional monitoring of the participants. The study envisions that the practice of physical activity aims to result in the reduction of diseases and help in glycemic control, making the lives of these patients with a better quality of life.

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