

## Research Article

# The Role of Physical Activities in the Complex Treatment of Type 2 Diabetes

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Romania**Received:** February 16, 2016; **Accepted:** March 15,  
2016; **Published:** March 18, 2016**Abstract**

The study's purpose is to highlight the importance of regular physical activities used as a method paired with diet therapy and medical treatment in people who have been diagnosed with type 2 diabetes. The research was done on 155 patients, with ages between 45-55 from a Bucharest clinic that specializes in endocrine metabolically disorders. These subjects were diagnosed with type 2 diabetes, which is being kept in control through diet and oral anti-diabetes medicine. The recommended physical activities were monitored by the following parameters, which started off with moderate values: intensity, volume, duration. All of these were progressively increased throughout the research, always in correlation with the glucose levels. Physical activities that are correctly monitored and personalized according to the functional status of the type 2 diabetes patients does contribute in improving the median values of the investigated biochemical parameters, helps the subjects to feel better and last but not the least, it can reduce the treatment costs.

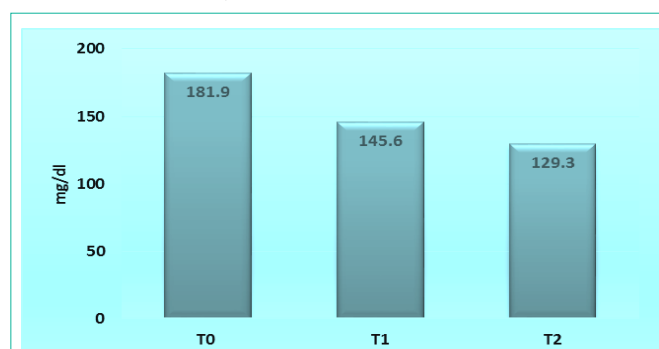
**Keywords:** Diabetes; Biochemical parameters; Physical activities**Introduction**

Currently, type 2 diabetes represents one of the most frequent endocrine metabolical disorders in people with ages between 40 and 60 [1-4]. The hospitalization of these people averages between 30 and 45 days per year and it involves a high financial effort for the community, as well as for the individual. Most of the times, it leads to an early retirement and has severe consequences over one's social life. The complex treatment of type 2 diabetes, combined with diet therapy and medical treatment has significant beneficial effects (medical, physical and psychological): it helps maintain the clinical and biochemical parameters in almost normal values and it also reduces the cost of treatment. The recommended physical activities are personalized depending on the biochemical and functional level of the evaluated indicators, as well as their pathology [5-8].

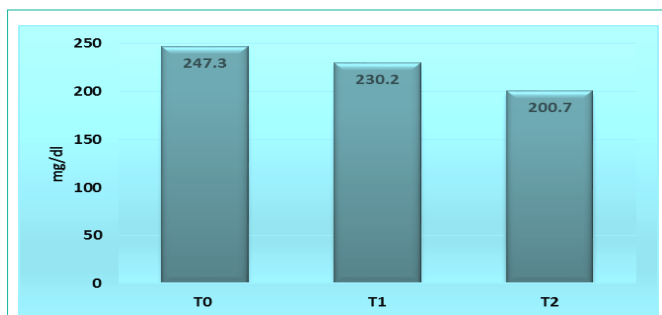
**Materials and Methods**

The purpose of the study is to determine how efficient physical activities are in maintaining or at most in improving the functional state of type 2 diabetes patients. The classic approach of aerobic effort when it comes to this particular pathology depends on frequency, duration and intensity [5]. The physical activity has to be customized and its main purpose reaching a certain effort level [6-10]. The research involved 155 patients with ages between 45-55 that have been diagnosed with type 2 diabetes kept in balance through diet and antidiabetic oral medicine, admitted into a Bucharest medical center that specializes in endocrine metabolic pathology. In the first stage the patients were admitted into the clinic for an average of 5 days in order to evaluate the endocrine metabolic status. The subjects were informed about the research's scope and gave their consent, as required by the Helsinki declaration in order for them to participate in this program. The study must not include the patients with high risk; therefore the assessment of patients was performed by a team

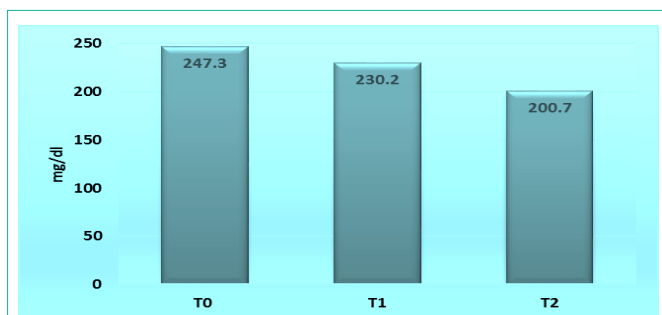
of specialists and consisted of: a complete physical examination focused on the cardiovascular system, peripheral nervous system and cutaneous alterations; ophthalmological exam pathologically specific; cardiopulmonary radiology; abdominal ultrasound; complete laboratory tests to determine the biochemical parameters. The physical activities that were recommended at first were of moderate intensity that was gradually increased depending on the glucose levels [5-7]. Efforts of high intensity were avoided during peak action peak of the insulin and after the oral medicine intake. The patients were advised to have a 10-20 g intake of carbohydrates, as juices, in order to prevent the post effort hypoglycemia. The activities included in the program included treadmill and ergometer bicycle, for 10-15 minutes; introducing breaks as each patient required [3]. The 30 minutes of effort were finalized through breathing and relaxation exercises. Other aerobic physical activity included in this study was walking [3,4]. The subject was monitored throughout the entire distance, as well as duration. Starting off with 1 kilometer, the patient slowly increases the duration and distance, reduces the breaks and maintains the intensity.



**Figure 1:** The average values for glycemia of 155 patients (T0 –initial; T1- at 3 months; T2 – at 6 months).



**Figure 2:** The average values for cholesterolemia of 155 patients (T0 –initial; T1- at 3 months; T2 – at 6 months).



**Figure 3:** The average values for triglyceridemia of 155 patients (T0 –initial; T1- at 3 months; T2 – at 6 months).

## Results

The initial biochemical determinations (T0) were considered reference data in evaluating the patients' physical activities. The monitored biochemical parameters were the following: glycemia, cholesterolemia and triglyceridemia. Using standardized laboratory methods, the first evaluation of the parameters took place after 3 months (T1) and the second one after 6 months (T2) (Figure 1). We mention that the normal values of blood glucose are between 70 and 110 mg/dl, for cholesterol less than 200mg/dl and for triglycerides is less than 150mg/dl.

From the data presented in Figure 1, there is a significant decrease for average values of blood glucose at 3 months (T1) and at 6 months

(T2) compared with initial average values (reference values); the decline is more pronounced at 6 months of starting physical activity. The graphical representation of the average values of cholesterolemia suggest a slight decrease of the T1 average and more significant of the T2 compared to the initial values (T0) (Figure 2).

Compared to the initial values the average value of triglyceridemia (Figure 3) show a slight decrease after 3 months as well as 6 months from the beginning of the physical activities.

## Conclusions

Physical activities that are correctly monitored (frequency, duration/length, intensity) and personalized depending on the functional status of the type 2 diabetes patients help keeping the average values of the specific metabolic parameters of diabetes pathology in balance, significantly improve one's wellbeing and can reduce the costs of treatment. The physical exercise recommended for type 2 diabetes is the aerobic one, with moderate intensity and 30 minutes length during which the energy substrate involved in its maintenance has to be primarily glucose and secondarily lipids.

## References

1. Paveliu Fraga S. Supraponderabilitatea si obezitatea de la preventie la tratament. Editura Infomedica. Bucuresti. 2002.
2. Perciun R. Tratamentul diabetului zaharat. Ghid practic. Editura Saeculum Vizual. Bucuresti. 2005.
3. Plas F, Hagron E. Kinetoterapie activa. Exerciții terapeutice. Editura Polirom, Iasi. 2001.
4. Pașcanu V. Bolile varstei a treia si tratamentul naturist integral. Editura Antet XX Press Bucuresti. 2003.
5. Bota C. Ergoziologie. Editura Globus. Bucuresti. 2002.
6. Apostu M. Biochimia efortului sportiv. Editura Discobolul. 2013.
7. Apostu M. Bioenergetica in activitatea sportiva. Editura Morosan. 2010.
8. Dragan I. Medicina sportiva. Editura Medicala. Bucuresti. 2002.
9. Wilmore HJ, Costill DI, Kenny WL. Physiology of Sport and Exercise. 5<sup>th</sup> edition. Human Kinetics. USA. 2012.
10. Benardot D. Advanced Sports Nutrition. Human Kinetics. 2006.