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# THE ROLE OF PRIMARY KINETOPROPHILAXY IN METABOLIC DISORDERS – EXOGENOUS OBESITY

Florentina Nechita (a)*
*Corresponding author

(a) Transilvania University of Brasov, No. 1, Universitatii Street, Brasov, 500068, Romania, florentina.nechita@unitbv.ro

## *Abstract*

Background. The paper aims to highlight the place and the role of primary kinetoprophilaxy in the fight against the overweight due to overeating and sedentariness. This situation generally occurs in people who have been accustomed to increased physical effort and have a comfortable life. The simple obesity is the best suited to primary kinetoprophilaxy with reliable results if the subject obeys the prescriptions prescribed by the physical therapist. This type of obesity has a higher proportion as the age is higher and is not accompanied, in most cases, by changes in the state of health in the initial stages of the disease, but later it can be associated with the most diverse and serious complications. Objectives. The study aims to identify and implement the most relevant kinetic prophylactic means of action in combating obesity according to the planned stages. Material and methods. The research was conducted in 2017 in Braşov and consisted of implementing a kinetic program based on outdoor activities to combat simple obesity of a 40-year-old patient. In order to carry out the research, Tanita was used, a competent analyst in the monitoring of the composition of the segmental overweight. Results. Treatment results show values highlighted by kinetic assessment of the patient indicating the monitoring of body composition. Conclusions. Kinetoprophilaxy, seen as a physical and sport activity, adapted, sustained and correctly monitored is an important therapeutic agent for combating exogenous obesity.



**Keywords:** Exogenous obesity, outdoor activities, kinetoprophilaxy, monitoring, Body composition.

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## 1. Introduction

In the last decades, overweight and obesity have been exponentially grown worldwide, both in genders and across all ethnicities, reaching epidemic proportions in adults. Approximately 24% to 50% of the adult population currently exceeds age and gender BMI in developed countries and developing countries (Ng et al., 2014; Popkin & Gordon-Larsen, 2004). The metabolism disorders predispose to adult obesity (Swinburn, Egger, & Raza, 1999; Singh et al., 2008) but also to early and late-onset cardiovascular and metabolic diseases: hypertension, atherogenic dyslipidemia (Manjunath, Rawal, Irani, & Madhu, 2013) and type 2 diabetes (Ayer, Charakida, Deanfield, & Celermajer, 2015; D'Adamo et al., 2015; Gupta, Goel, Shah, & Misra, 2012).

The exogenous obesity is a nutritional and metabolic disorder in which fat is accumulated in excess in the body, resulting in increased body mass. This is not just an aesthetic stigma, as it is considered in the most cultures, but it is one of the most worrying health problems. Balint (2006) reported that exogenous or simple obesity is the effect of overeating and sedentariness, especially for those who have been accustomed to an increased physical effort and have a comfortable life with low energy loss.

The obesity in the contemporary world is a serious health problem, with a steadily rising percentage of people with excessive body mass. The most influential factors in the metabolic disorder are the inadequate eating habits and the lack of physical activity. Hady et al. (2010) confirm that they are a major health concern in the world (Margolis-Gil, Yackobovitz-Gavan, Phillip, & Shalitin, 2018; Shannawaz & Arokiasamy, 2018).

The exogenous obesity been assessed in numerous publications like a risk factor for health (Shirkhani et al, 2018; Ruano, Lucumi, Alban, Arteaga, & Fors, 2018).

Within this category, simple obesity, the body accumulates excess fats excessively and distributes them generically to the subcutaneous fat as well as other regions, the areas of selection being for the subcutaneous tissue: the trunk, the abdomen, the arms and the legs.

In combating exogenous obesity, the focus is on the importance of healthy lifestyle and implicitly on the regular practice of outdoor activities. Thus, the effects of these exercises contribute to the recovery of all vital functions (Cioroiu, 2003; Cioroiu & Moldovan, 2009; Mijaica & Balint, 2013).

The simple obesity is best suited for primary kinetoprophilaxy, with reliable results if the subject complies with prescriptions prescribed by the physical therapist. This type of obesity has a higher proportion because age is higher and is not usually accompanied by changes in health status in the initial stages of the disease but may later be associated with the most diverse and serious complications (Ayer et al., 2015; D'Adamo et al., 2015; Gupta et al., 2012, p.55).

The importance of combating fat tissue in adults should be carefully considered for to determine if it is in a simple stage, and for this stage will develop the kinetic programs specific to its improvement. Health is the support on which we must focus our attention in every stage of our life.

The exercise therapy is well received by patients, and several systematic reviews and randomized controlled trials have reported the positive effects of combating obesity on quality of life (Gori et al., 2017; Negrini & Carabalona, 2006; Schreiber et al., 2015).

Waters et al., 2011 refer to the efficacy of various alternative methods of combating obesity contributing to a healthy lifestyle. After the stratifying studies on the context and duration of the program

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and the age of the patient, the authors conclude that the overall efficacy of the proposed interventions in reducing BMI (Nogueira & Zambon, 2013; Borus & Laffel, 2010).

## 2. Problem Statement

### 2.1. Participants

The research was carried out at the Research and Development Institute of the Transilvania University of Brasov and was based on a case study. The subject, N.F., who was studied is aged 40 and was investigated after having followed a program to combat the exogenous obesity of 9 months.

The research parameters were monitored by recording their values using the body composition analyser, Tanita BC - 418 MA (Figure 1).

The program consisted of applying methods and means based on outdoor kinetic activities that induce a series of effects on the body that were systematized into: morphogenetic effects (weight loss), functional and therapeutic effects (muscular toning) and prophylactic effects (maintaining the state of health).

## 3. Research Questions

The kinetic program to combat the simple obesity was to identify and implement the most relevant exercises with varying degrees of difficulty, altered depending on the patient's response and particularities.

The program was structured over 9 months and included three main intervention stages:

- The first training session was based on the morphogenetic effects (weight loss) stage (the first three months of training) in which the subject was formalized with articular and abdominal kinetic exercises and exercises specific to basic gymnastics.
- The functional and therapeutic effects (muscle toning) concerned anaerobic isometric exercises with interrupted contractions and passive pauses for the development of trunk, arms and legs muscles and the Recovery Run.
- The stage of prophylactic effects covered the last three months of the research and had as means of intervention: exercises specific to corrective gymnastics and stretching.

The program consisted of 60 minutes sessions and the exercises included in the program had the role of fighting the patient's obesity.

## 4. Purpose of the Study

The topic approach is based on the fact that adult fat intake is due to decreased muscle mass and increased body fat deposits.

The study consisted in identifying and implementing the most relevant prophylactic kinetic means of action in combating obesity according to the planned stages.

The theme of this study is to show the benefits of well-planned outdoor kinetic exercises in combating exogenous obesity.

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## 5. Research Methods

The research included two evaluation moments with the Tanita BC-418 MA: initial testing and final body weight testing of the subject.

The ”Tanita” BC-418 MA (Figure 1) provides a complete print out of detailed body composition analysis- weight, body fat%, BMI, fat mass, fat free mass, and so much more - all without the traditional intrusive measurement methods. The measurement system comprises 8 bioelectric electrodes impedance analysis and a computer interface: RS-232 bidirectional.

Dual hand grips enhance Tanita's ability to calculate body composition results in the trunk, as well as the lower and upper body extremities. The BC-418 MA provides a significant improvement to the calculation of basal metabolic rate. Instead of simply relying on weight, age and gender, Tanita's proprietary formula takes into account fat free mass, providing a higher level of accuracy compared to current BMR formulas.

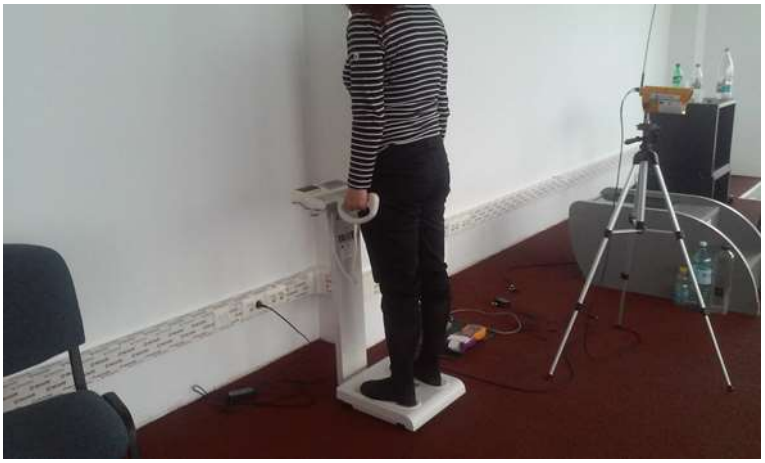

**Figure 01.** Body Composition Analyser, Tanita BC – 418 MA

The parameters identified and monitored during the study were: body mass index (BMI), basal metabolic rate (BMR), fat (F), fat mass (FM), fat free mass (FFM), total body water (TBW) and visceral fat rating (VFR).

The implementation of the kinetic program was carried out through the following steps using various outdoor means:

*Stage I* of the kinetic program - includes as objective: weight reduction aimed at raising the muscles, with emphasis on eliminating the misshapen aspect of adipose tissue. The purpose of kinetic means was to activate the subject's energy consumption using articulated gymnastics exercises and applied exercises.

*Methods of intervention:*

- Initial position (PI): The stand upright - lifting the legs alternately bent forward, 4 series of 8 repetitions with 30 seconds break;
- PI: The stand upright with his arms extended sideways – the bending the trunk with grasping your ankles with your hands, 4 series of 10 repetitions with 40 seconds break;
- PI: The stand upright on the elliptical bike - long and fast movements of the legs, 4 series of 8 repetitions with 30 seconds break;

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- PI: The stand upright - walked on 20m distance - perform alternate lifting of the left-bent forward leg, simultaneously with the lifting of the lateral arms, 4 series rhythm alert with 60 seconds break.

*Stage II*, after 90 days, are the consequence of morphogenetic effects, being obvious and immediate. Objective: helps to maintain mobility and joint stability, as well as toning muscles.

During this stage the means will follow the morph -functional development of the muscles of the trunk, arms and legs. They will be performed anaerobic isometric exercises with interrupted contractions, passive pauses and the Recovery Run.

Methods of intervention:

- PI: Dorsal decubitus - lifting the basin with maintaining the position 15 seconds, 10 seconds break, 4 series of 5 repetitions;
- PI: The stand upright with bent legs at 90°, arms stretched forward - maintaining the position 15 seconds, 10 seconds break, 4 series of 5 repetitions;
- PI: Forearm Plank, the plank position with the body straight and abs tight - the bending the arms and lowering the body, concentrating weight on the forearms 15 seconds, 10 seconds break, 4 series of 5 repetitions;
- The Recovery Run, distance 5 km, low speed 7 min / km.

*Stage III* presents the prophylactic effect: maintaining and continuously strengthening health. The main objective is to strengthen the results of the kinetic means that were taken in the previous stages and to prevent relapses.

The maintenance plan's methodical scheme will help shape a new lifestyle:

- The free active exercises;
- The applicative exercises based on the toning of all muscle groups;
- Stretching;

The Recovery Run of medium duration.

## 6. Findings

**Table 01.** Clinical characteristics of patient NF - The whole body measurements (Pre and Post-test

| Parameter | Pre - test | Post - test | Difference (Pre and Pro – test) |
|---|---|---|---|
| **Age** | 40 | 41 | - |
| **Height (cm)** | 170 cm | 170 cm | - |
| **Weight (kg)** | 85 kg | 72 kg | 13 kg |
| **BMI** | 29,41 | 24,91 | 4,40 |
| **BMR (kj)** | 7268 kj | 7008 kj | 260 kj |
| **F%** | 27,2% | 24% | 3,2% |
| **FM (kg)** | 37,5 kg | 21,3% | 16,2 kg |
| **FFM (kg)** | 51,9 kg | 59,4 kg | 7,5 kg |
| **TBW %** | 43,5% | 40,7 % | 2,8 % |
| **VFR** | 5 | 4 | 1 |

Table notes: BMI - body mass index, BMR - basal metabolic rate; F - fat; FM - fat mass; FFM – fat free mass; TBW - total body water ; VFR - visceral fat rating;.

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The process of evaluation includes the whole body measurements (Table 01) and the segmental measurements (Table 02):

Following the evaluation process of the whole body measurements the following values were recorded at the parameters investigated: The BMI parameter shows a 4.4% difference from the initial test, with a final test value of 24.91. Thus, according to the medical classification of obesity (Balint, 2006) indicates that the transition from exogenous obesity to overweight was reached. The VFR and F% parameter recorded normal values: VFR-1, located deep in the abdominal base and providing vital organ protection as well as excess fat (F%), with a difference of 3.2 kg compared to the initial test.

Although the body has need healthy body fat, too much fat can damage the long-term health. Reducing excess levels of body fat on 27,2% to 24% has been shown to directly reduce the degree of obesity.

The average healthy range for women is 45 to 60% for parameter TBW. In this research, the TBW indicator is 40.7, which denotes a value below the normal limit.

The BMR is measurement can be used as a minimum baseline for a diet programme. Additional calories can be included depending on your activity level. The BMR, 7000 kj, at the final test is not slow, which results in a lower decrease in body weight and total weight.

The relevance of these measurements is found in the weight parameter. It has a decrease of 13 kg compared to the initial test. The difference in value at this parameter is the result of the efficiency of the applied kinetic program.

In Table 02 are presented the values recorded in the measurements performed at the level of the arms and legs in the pro – test.

**Table 02.** Clinical characteristics of patient NF – The segmental measurements at the level of the arms (Pre and Post-test)

| **Parameter (Post - test)** | **The left arm** | **The right arm** | **The left leg** | **The right leg** |
|---|---|---|---|---|
| **F%** | 26,3% | 26,3% | 26,2% | 27,9% |
| **Fat mass (kg)** | 1,3kg | 1,2kg | 3,7kg | 3,9kg |
| **FFM (kg)** | 3,5kg | 3kg | 10,3kg | 10,05kg |
| **Predicted muscle mass** | 3,3kg | 3,1kg | 9,7kg | 9, kg |

As shown in Table 02, muscle mass in the arms and legs had effects between the use of kinetic exercises aimed at strengthening the basic muscles and decreasing the adipose tissue.

As your muscle mass increases, the faster the body is able to burn calories/energy. This leads to an increase of your basal metabolic rate (BMR), which helps in losing weight. Post-test results indicate a significant decrease in adipose tissue values in the two segments.

Also, the significant post - test values in both directions show an improvement in the patient's the state of health

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## 7. Conclusion

The Tanita analyser introduces a significant improvement in basal metabolic rate calculation. Instead of simply relying on weight, age and sex, Tanita's proprietary formula takes into account the free fat mass, offering a higher level of accuracy than the current BMR (Kelly & Metcalfe, 2012). The applied program fulfilled its goals, recording significant differences between the Pre and Post - test, changing the physical aspect of the subject well. The kinetic program also has a simple and complete character with considerable importance in altering the body fat (Popa, 2016; Cioroiu & Moldovan, 2009; Curitianu & Cătănescu, 2016). The findings of the present research show an improvement in subject parameters with a significant decrease in total fat (F- 3,2%) as well as a considerable weight decrease of 13 kg, from an average of 85kg pre-program to post-program value of 72kg. The extent of this effect along with other changes in body composition should be considered in the use of these data for clinical comparison. We recommend these data for TBW as current, limited reference data for healthy adults (Chumlea, Guo, Zeller, Reo, & Siervogel, 1999). Kinetoprophilaxy consists of applying physical activity to the principles of medical training science and applies to different categories of persons (Scarlet, Brăilescu, & Nica, 2009).

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## References

Ayer, J., Charakida, M., Deanfield, J.E., & Celermajer, D.S. (2015). Lifetime risk: childhood obesity and cardiovascular risk. *European Heart Journal*, 36, 1059–1061

Balint, T. (2006, October 19). Kinetoterapia – o alternativă în combaterea obezității. Retrived from http://cadredidactice.ub.ro/balinttatiana/files/2011/03/koaico-cu-cip.pdf

Borus, J.S., & Laffel, L. (2010). Adherence challenges in the management of type 1 diabetes in adolescents: prevention and intervention. *Current Opinion Pediatrics*, 22 (4), 405–411. https://dx.doi.org/10.1097/MOP.0b013e32833a46a7

Chumlea, C.M., Guo, S.S., Zeller, C.M., Reo, N.V., & Siervogel, R.M. (1999). Total body water data for white adults 18 to 64 years of age: The Fels Longitudinal Study. *Clinical Nephrology – Epidemiology – Clinical Trial*, 56 (1), 244 – 252. https://dx.doi.org/10.1046/j.1523-1755.1999.00532.x

Cioroiu, S.G. (2003). The role of therapeutic exercises to adapt to the effort. *Olympic news magazine: Section interdisciplinary sciences in guided drive actions* (pp. 300-305). Brasov: University of Transilvania Brasov.

Cioroiu, S.G., & Moldovan, E. (2009). The impact of physical activity on health – a current problem. *Bulletin of Transilvania University of Brasov*, 2 (51), 85-92

Curițianu, I., & Cătănescu, A. (2016, September 20). The Effect of Six-Week TRX Suspension Training on Physical Skills in Female Skier Students. Retrieved from http://www.futureacademy.org.uk/files/images/upload/178.%20EduWorldF%202017.pdf

D'Adamo, E., Guardamagna, O., Chiarelli, F., Bartuli, A., Liccardo, D., Ferrari, F., & Nobili, V. (2015). Atherogenic dyslipidemia and cardiovascular risk factors in obese children. *International Journal of Endocrinoogyl*, 912047. https://dx.doi.org/ 10.1155/2015/912047

Gori, D., Guaraldi, F., Cinocca, S., Moser, G., Rucci, P., & Fantini, M.P. (2017). Effectiveness of

educational and lifestyle interventions to prevent paediatric obesity: systematic review and meta-analyses of randomized and non-randomized controlled trials. *Journal of Obesity Science Practice, 3* (3), 235 -248

Gupta, N., Goel, K., Shah, P., & Misra, A. (2012). Childhood obesity in developing countries: epidemiology, determinants, and prevention. *Endocrine Reviews*, *33*(1), 48-70. https://dx.doi.org/10.1210/er.2010-0028

Hady, R.H., Zbucki, R.L., Luba, M.E., Golaszewski, P., Ladny, R.J., & Dadan, J.W. (2010). Obesity as a Social Disease and the Influence of Environmental Factors on BMI in Own Material. *Journal of Advances in Clinical and Experimental Medicine*, *19* (3), 369 -378.

Kelly, J.S., & Metcalfe, J. (2012, September 11). Validity and Reliability of Body Composition Analysis Using the Tanita BC418-MA. *Journal of Exercise Physiology*. 74-83. Retrieved from https://www.asep.org/asep/asep/JEPonlineDECEMBER2012_Kelly.pdf

Manjunath, C.N., Rawal, J.R., Irani, P.M., & Madhu, K. (2013). Atherogenic dyslipidemia. *Indian Journal of Endocrinology and Metabolism*, *17* (6), 969 – 976. https://dx.doi.org/10.4103/2230-8210.122600

Margolis-Gil, M., Yackobovitz-Gavan, M., Phillip, M., & Shalitin, S. (2018). Which predictors differentiate between obese children and adolescents with cardiometabolic complications and those with metabolically healthy obesity? *Journal of Pediatric Diabetes*, *19* (7), 1147 – 1155

Mijaica, R., & Balint, L. (2013). School physical activities between the formal and non-formal education. *Journal of Procedia-Social and Behavioral Sciences*, *76*, 503 – 510.

Negrini, S., & Carabalona, R. (2006). Social acceptability of treatments for adolescent idiopathic scoliosis: a cross-sectional study. *Scoliosis and Spinal Disorders*, 1-14. https://dx.doi.org/10.1186/1748-7161-1-14

Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., …Gakidou, E. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, *384*(9945), 766-781. https://dx.doi.org/10.1016/S0140-6736(14)60460-8

Nogueira, T.F., & Zambon M.P. (2013). Reasons for non-adherence to obesity treatment in children and adolescents. *Revista Paulista Pediatrie*, *31*(3), 338–343. https://dx.doi.org/10.1590/S0103-05822013000300010.

Popa, D. (2016, September 15) Optimum Recovery From Certain Traumas Through Aqua gym. Retrived from http://www. defs.unibuc.ro/ sesiune b / ticket/ticket.php?.

Popkin, B.M., & Gordon-Larsen, P. (2004). The nutrition transition: worldwide obesity dynamics and their determinants. *International Journal of Obesity Related Metabolic Disorders*, *28* (3), 2–9

Ruano, C., Lucumi, E., Alban, J., Arteaga, S., & Fors, M. (2018). Obesity and cardio-metabolic risk

factors in Ecuadorian university students. First report, 2014-2015. *Diabetes & Metabolic Syndrome – Clinical Research - & Reviews*, *12* (6), 917 – 921

Scarlet, R., Brăilescu, C., & Nica, A.S. (2009). Methods and particularities of the evaluation and application of kinetoprophylaxy during active balneary treatment. *Palestrica Mileniului III – Civilizație și Sport*, *35* (1), 20 – 26

Schreiber, S., Parent, E.C., Moez, E.K., Hedden, D.M., Hill, D., Moreau, M.J., …Southon, S.C. (2015). The effect of Schroth exercises added to the standard of care on the quality of life and muscle endurance in adolescents with idiopathic scoliosis-an assessor and statistician blinded randomized controlled trial: "SOSORT 2015 Award Winner". *Scoliosis*, 10-24. https://dx.doi.org/10.1186/s13013-015-0048-5

Shannawaz, M., & Arokiasamy, P. (2018). Overweight/Obesity: An Emerging Epidemic in India. *Journal of Clinical and Diagnostic Research*, *12* (11), LC01 – LC05. https://dx.doi.org/10.7860/JCDR/2018/37014.12201

Shirkhani, S., Marandi, S.M., Kazeminasab, F., Esmaeili, M., Ghaedi, K., Esfarjani, F., … Nasr-Esfahani, M.H. (2018). Comparative studies on the effects of high-fat diet, endurance training and obesity on Ucp1 expression in male C57BL/6 mice. *Journal Gene*, *676*, 16 – 21.

Singh, A.S., Mulder, C., Twisk, J.W.R., Van Mechelen, W., & Chinapaw, M.J.M. (2008). Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obesity Reviews*, *9* (5), 474–488. https://dx.doi.org/10.1111/j.1467-789X.2008.00475.x

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine*, *29*, 563–570. https://dx.doi.org/10.1006/pmed.1999.0585

Waters, E., Silva-Sanigorski, A., Hall, B.J., Brown, T., & Campbell, K.J. (2011, October 23). Interventions for preventing obesity in children. *Cochrane*, Retrived from https://www.cochrane.org/CD001871/PUBHLTH_interventions-for-preventing-obesity-in-children, https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD001871.pub3/full