08 - MUSCLE FORCE TRAINING AND REDUCTION OF CARDIOVASCULAR RISK FACTORS IN ADULT WOMEN WITH METABOLIC SYNDROME

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introduction
The forms of behavior and lifestyle of the world population, from the second half of the twentieth century, demonstrated severe changes in nutritional habits and the prevalence of sedentary lifestyle. These factors contributed to the growing epidemic of chronic diseases (obesity, diabetes mellitus and hypertension), conditions that occur with lipid changes, hypercoagulability and increased risk of cardiovascular disease (CD) (POZZAN et al., 2004).

Individuals with CD have associated risk factors, called Metabolic Syndrome (MS), described as a set of simultaneous pathophysiological changes capable of increasing mortality by about 2.5 times in cases of Infarction, Stroke and Cancer (POZZAN et al., 2004; VOLT et al., 2008).

In 2001 at the "Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults" (NCEP-ATPIII), three clinical laboratory criteria were established for the diagnosis of MS among the following 5: Abdominal circumference (>8 cm for women, >102 cm for men); (≥150mg / dL), HDL cholesterol (<40mg / dL for men <50mg / dL for women), fasting glucose (≥ 110mg / dL) and blood pressure (≥ 130 / 85mmHg).

Nakazone et al. (2007) mentions that CD is leading to death in developed countries, with large growth in underdeveloped countries, being considered the main cause of death in Brazil. Sedentary lifestyle increases the risk of premature mortality, in the same way as smoking, dyslipidemia and systemic arterial hypertension (SAH). Epidemiological studies (LAKKA et al., 2003; RENNIE et al., 2003), showed a strong relationship between physical inactivity and the presence of cardiovascular risk factors, due to the MS.

The regular practice of physical training has been recommended as non-drug intervention for the prevention and treatment of chronic and cardiovascular diseases (VASQUES & LOPES, 2009; ACSM, 2001). Among the variations of physical training, muscle strength training (MTF) is essential to the development of physiological functions; increases muscle mass, the volume of fast fibers, elevates the basal and rest metabolic rate, in addition to producing an additional expenditure of energy during its execution, expressed by the Metabolic Rate of Effort (BRUM et al., 2004; NEIVA et al., 2012).

Consideration should be given to a significant increase in oxygen consumption, which consequently contributes to the acceleration of metabolism after the end of the effort, a factor known internationally by the acronym EPOC (Excess Post-exercise Oxygen Consumption) (WILDAELLE, et al., 2007). As a result, there is a consequent impact related to the process of weight loss and the control of some biochemical changes, which are positive factors in the fight against MS (ACSM, 2001; NEIVA et al., 2012).

The Ministry of Health (2010) presented the proposals of the National Politic for Health Promotion, and the creation of the Family Health Support Centers (FHSC), enabling the Physical Education professional to base their actions in this segment, making use of physical exercise prescription as an instrument of prophylaxis, intervening in social behavior, to optimize healthy practices that contribute to positive change in the MS, resulting in a reduction in drug costs and hospitalizations.

The objective of this study was to identify the effects of MTF on the body composition and lipid profile in adult women, as a way to mitigate the condition of vulnerability to MS, of the beneficiaries of the physical activity programs developed by the FHSC in the city of Araçatuba / SP.

METHODS

Study Characterization and Population
The sample consisted of 39 women (51 ± 6.4 years), with a positive profile for MS. The selection was based on the following inclusion criteria:
- to attend the FHSC Araçatuba physical activity programs;
- to have a medical diagnosis for MS according to NCEP-ATPIII (2001);
- do not use medicines;
- had no orthopedic limitations;
- had no experience with MTF;
- presented a medical certificate releasing the practice of physical exercises.

The volunteers had the support of the multidisciplinary team of FHSC Araçatuba (ordinance 256/13), composed by professionals of Physical Education, Psychologist, Physiotherapist and an Endocrinologist, responsible for the request of the laboratory exams.

After extensive and detailed explanation of the purposes and methods of this study, the volunteers signed a Free and Informed Consent Form. This study followed the guidelines of Resolution of the National Health Council 466/12, and was approved by the Research Ethics Committee under the number 634.874 / 14.

Groups Composition

Group 1 - "G1" (15 volunteers) - Practiced 4 training sessions per week, 2 sessions developed with gymnastics and dance routines, with FHSC team; and 2 other weekly sessions of MTF worked in a supervised manner. The activities ranged from 24 to 48 hours apart.

Group 2 - "G2" (14 volunteers) - Performed only 2 training sessions per week, developed with gymnastics and dance routines, with the FHSC team. Sessions ranged from 48 to 72 hours.

Group 3 - GC "Control" (10 volunteers): They did not undergo any routine of physical training in this period.

doi:10.16887/88.a1.8
Table 1. Body Composition representation (mean and standard deviation ±) of the variables: body mass (kg), height (m), and absolute body fat, of the volunteers. Pre- and post-intervention data (12 weeks).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Phases 1 and 2</th>
<th>G1</th>
<th>G2</th>
<th>GC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body mass (kg)</td>
<td></td>
<td>78.59 ± 12</td>
<td>72.67 ± 6%</td>
<td>66.67 ± 5%</td>
</tr>
<tr>
<td>% Fat</td>
<td>25 ± 5.85</td>
<td>26 ± 5.50</td>
<td>15 ± 6.50</td>
<td>14 ± 6.50</td>
</tr>
<tr>
<td>Lean mass (kg)</td>
<td>50.1 ± 15</td>
<td>52.0 ± 6.5</td>
<td>43.0 ± 5.8</td>
<td>56.7 ± 6.5</td>
</tr>
<tr>
<td>Body Fat (kg)</td>
<td>27.5 ± 4.5</td>
<td>21.5 ± 4.5</td>
<td>22.3 ± 4.5</td>
<td>31.1 ± 4.5</td>
</tr>
</tbody>
</table>

* Significant effect on phases 1 and 2 (p < 0.05)

The magnitude of changes in body composition depends on factors, directly or indirectly related to physical training. The differences in the comparison between the studies available in the literature that investigate the practice of MTF may be linked to a series of variables such as: the duration of the study; the training protocols employed; intensity and volume applied; to the existence or not of nutritional control, among others.

Table 2. Representation (mean and standard deviation ±) of the variables: Fasting glycemia, and cholesterol (HDL, LDL and Total Cholesterol) in ml/dl of the volunteers. Pre and post intervention data (12 weeks).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Phases 1 and 2</th>
<th>G1</th>
<th>G2</th>
<th>GC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycemia (ml/dl)</td>
<td>114 ± 22</td>
<td>119 ± 23</td>
<td>114 ± 25</td>
<td>118 ± 21</td>
</tr>
<tr>
<td>HDL (ml/dl)</td>
<td>45 ± 6</td>
<td>44 ± 6</td>
<td>45 ± 6</td>
<td>46 ± 6</td>
</tr>
<tr>
<td>LDL (ml/dl)</td>
<td>151 ± 24</td>
<td>151 ± 24</td>
<td>151 ± 24</td>
<td>151 ± 24</td>
</tr>
<tr>
<td>Total Cholesterol (ml/dl)</td>
<td>209 ± 13.5</td>
<td>209 ± 13.5</td>
<td>209 ± 13.5</td>
<td>209 ± 13.5</td>
</tr>
</tbody>
</table>

* Significant effect on phases 1 and 2 (p < 0.05)
We identified a case study that analyzed the influence of MTF on a circuit with a series of 30 repetitions, combined with aerobic training (60 to 80% heart rate), in order to control the glycemia of a male subject (27 years), type 1 diabetic, for 90 days. There was a 41.52% decrease in glycemic indexes, from 209.3 mg / dl to 122.4 mg / dl. (LIMA et al., 2013)"

On the other hand, Danilo, Mattos & Higino (2006) verified the influence of MTF on fasting glycemia and other physiological parameters of 8 women (59.87 ± 8.62 years old) with DM2. The volunteers were submitted to circuit sessions 3 times a week for 8 weeks. Fasting glycemia did not present a significant difference, despite a significant reduction in body mass.

For the levels of cholesterolemia, significant differences in G1 were identified in the present study. TC had a significant reduction of 21 ml / dl (± 7.5), HDL showed a significant progression from 42 (± 8) to 56 ml/dl (± 13), and finally, LDL presented a reduction of 157 ml/dl (± 21.5), to 123 ml / dl (± 10.5).

These results indicate that the study was successful in modulating levels of cholesterolemia, and that MTF can be used as an alternative to controlling the lipid profile of individuals presenting MS.

In a study comparing MTF induced physiological adaptations for 14 weeks in 24 women (± 50 years), divided into 2 equal groups, the CG and the MTF group, evaluated the lipid profile and body composition of the volunteers. The results showed that the MTF group achieved significant reductions in body mass, %Fat, basal metabolic rate, TC, triglycerides and VLDL cholesterol when compared before and after the intervention period between the groups (NEVES et al., 2013).

CONCLUSION

Consistent with the established goals, it can be concluded that 12 weeks of MFT for women over 50 years old can provide positive changes in body composition, and some metabolic components responsible for cardiovascular diseases, such as glycemia and cholesterolemia, contributing to a reduction in the vulnerability to MS.

It is suggested that, due to the low financial cost and the ease of use of the evaluation and physical training methods presented in this study, these procedures can be used and / or recommended to Physical Education professionals, acting in a multidisciplinary capacity, with the intention promote health promotion public policy in the different populations. However, it is necessary to develop new investigations, with similar designs, supplying the limitations of the present study.

BIBLIOGRAPHIC REFERENCES


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Abstract: This study evaluated the effects of 12 weeks of muscle strength training (MST) in 39 women (51 ± 6.4 years) with Metabolic Syndrome, investigating changes in body composition, cholesterolemia and fasting glycemia. The data were presented through the mean and the standard deviation of the quantitative variables, compared by one-way ANOVA Variance Analysis using the Tukey post-test, with significance level $p \leq 0.05$. It was concluded that MST brought significant changes in body composition, blood glucose and cholesterolemia.

Keywords: Cardiovascular Diseases. Metabolic syndrome. Physical training

Formation de la force musculaire et réduction des facteurs de risque cardiovasculaire chez les femmes adultes présentant un syndrome métabolique

Résumé: Cette étude a évalué les effets de 12 semaines de la musculation chez 39 femmes (51 ± 6,4 ans) atteintes de syndrome métabolique, explorant les changements dans la composition corporelle, la cholestérolémie et la glycémie à jeun. Les données ont été présentées par la moyenne et l’écart-type des variables quantitatives, comparées par l’analyse de la variance ANOVA à un facteur utilisant le test post-test de Tukey, avec un niveau de signification $p \leq 0.05$. Il a été conclu que la musculation a apporté des changements significatifs dans la composition corporelle, la glycémie et la cholestérolémie.

Mots-clés: Maladies cardiovasculaires. Syndrome métabolique. Éducation physique

Entrenamiento de la fuerza muscular y reducción de factores de riesgo cardiovascular en mujeres adultas con síndrome metabólico

Resumen: Este estudio evaluó los efectos de 12 semanas de entrenamiento de fuerza muscular (EFM) en 39 mujeres (51 ± 6,4 años) con Síndrome Metabólico, explorando los cambios en la composición corporal, la colesterolemia y la glucemia en ayunas. Los datos se presentaron a través de la media y la desviación estándar de las variables cuantitativas, comparadas por medio de la Análisis de Varianza ANOVA unidireccional utilizando la prueba posterior de Tukey, con un nivel de significación $p \leq 0.05$. Se concluyó que EFM trajo cambios significativos en la composición corporal, la glucosa en sangre y la colesterolemia.

Palabras clave: Enfermedades cardiovasculares. Síndrome metabólico. Entrenamiento físico

Treinamento de força muscular e redução dos fatores de risco cardiovascular em mulheres adultas com síndrome metabólica

Resumo: Este estudo avaliou os efeitos de 12 semanas de treinamento de força muscular (TFM) em 39 mulheres (51 ± 6,4 anos) com Síndrome Metabólica, investigando alterações sobre a composição corporal, colesterolemia e glicemia em jejum. Os dados foram apresentados através da média e o desvio padrão das variáveis quantitativas, comparados por meio da Análise de Variância one-way ANOVA utilizando-se o pós-teste de Tukey, com nível de significância $p \leq 0.05$ através do software GraphPad Prism 6.0. Concluiu-se que o (TFM) trouxe alterações significativas na composição corporal, glicemia e colesterolemia.

Palavras Chave: Doenças Cardiovasculares. Síndrome Metabólica. Treinamento Físico.