



Scholars Research Library

Annals of Biological Research, 2012, 3 (12):5552-5555
(<http://scholarsresearchlibrary.com/archive.html>)



The Effects of One Session Taekwondo Exercise the T_3 , T_4 , and TSH Hormones in Young Taekwondo Athletes

Mohammad Hassan Boostani^{1*}, Mohammad Ali Kohanpour², Mohammad Ali Boostani¹, Hadi Bashafaat³ and Seyed Ebrahim Hosseini⁴

¹Islamic Azad University, Arsanjan Branch - Young Researchers Club, Fars, Iran

²Department of Exercise Physiology, faculty of Physical Education and Sports Sciences, Islamic Azad University, Central Tehran Branch, Tehran, Iran

³Eduction Organization of Fars Province, Iran

⁴Department of Biology, Science and Research Branch, Islamic Azad University, Fars, Iran

ABSTRACT

Concentrations of thyroid and their thyrotrophic hormone can be suitable index for exercise pressure. But the effects of sport on thyroid hormones in not only it have been less attention but also are not clear well. 16 young taekwondo athletes with average 22.7 ± 2.02 years, 176.5 ± 3.82 cm height and 71.29 ± 8.73 kg weight was selected purposeful and were participated in one session taekwondo exercise for our hour with %70 intensity maximum heart rate (HR max). Before and immediately after and one hour after exercising blood sampling were taken and was measured the concentration of thyroid stimulating hormone (TSH), thyroxin (T_4), and triiodothyronine (T_3). To examine changes variance ANOVA test were used and only in T_4 hormone, significant difference was observed, that the difference between before and one hour after exercise was significant ($P < 0.05$). In fact these three hormones increased of exercising which of course about TSH was less decreased till one hour after exercise. In T_3 and T_4 minor and non-significant increasing was observed. With pay attention to increased TSH, T_4 and T_3 hormones which is followed by exercise in present research, it seems to training taekwondo with intensity and duration, doesn't enter double pressure in the body, and it can be use for improvement health and cardio-respiratory fitness for all people.

Key Words: Thyroid Hormones, Thyroid Stimulating Hormones, Thyroxin, Triiodothyronine, Taekwondo

INTRODUCTION

One tools of understanding physical activity stress, evaluating of existing biological hormones in blood. The major thyroid gland secretion is thyroxin hormone. This later loses their iodine for producing Triiodothyronine (T_3), the most active thyroid hormones [12]. Also, both of them find in free form (FT_4) (FT_3) that they are important in general regulation metabolism growth, tissues differences and also gene expression for long time before has known [9,23].

When exercise is repeated at certain interval, there is an interaction between pituitary and thyroid that coordinated well by increasing changes and conversion thyroid hormones [16]. Different opinion is being about the effects of sport on the thyroid function and it seems that it depend on intensity and exercise protocol duration [18].

Researchers come to this conclusion that changes of T_3 , T_4 during exercise have correlation with intensity and training duration and it causes stimulation sympathetic thyroid gland [5]. Some researchers stated that physical exercise has not effects on the secretion of these hormones in animals [20].

In another study which were done on the effects of physical exercise on the secretion of these hormones, was determined that T₃ hormones reduce but doesn't change significantly [1,22].

Total levels of T₃ serum immediately after exercising was increased significantly, whereas total levels of T₄ and TSH didn't change [17]. Other researchers reported that during suitable long-term exercise T₄ and rT₃ increased and T₃ decreased because of changes of plasma free fatty acid (FFA) concentrations, glucose, and another food [3,24].

In another research which were done by Foman (2012) about exercise intensity and their effects on thyroid hormones on the active men, have shown that aerobic training, strongly effect on level of thyroid hormones in blood circulation, so that the amount of TSH, FT₄, T₄ in continue activities in creased %90 MHR but the amount of FT₃, T₃ start to decrease [6]. Anyway with look at the previous findings, we know that the role of training it isn't so clear in thyroid hormone metabolism. The relationship between increasing training till 80 km in week and increasing thyroid hormones level has been verified [8].

Jezel et al., studied levels of thyroid hormones of professional cyclist during 3 weeks stage race and came to conclusion that levels of FT₃, FT₄, T₄ serum, in the last week of competition show significant increasing, whereas T₃, TSH concentrations remain unchanged [10]. Another survey which do by Pourvaghar & Shahsavari (2009) show that the levels of TSH, T₃ thyroid hormones increased after doing severe aerobic activities [15]. The aim of this research is studying the effects of one session taekwondo exercise on thyroid hormones and stimulating hormones in young men.

MATERIALS AND METHODS

16 young taekwondo athletes were participated in this research with average 22.7±2.02 years, 176.5 ± 3.82 cm height, 71.29±8.73 kg weight and VO_{2max} consumption 51± 2.73 ml. kg⁻¹. min⁻¹ which they do regular training at least 2 and utmost 4 days a week in two past years. Participants take part at one taekwondo training protocol for 60 minutes, with %70 HR max intensity. Exercise protocol include 10 minutes warm-up, 10 minutes kick exercise, 10 minutes punch exercise, 10 minutes combined training, 5 minutes match competition and 5 minutes cool-down. Between every phase athletes have an active rest for 2 minutes. Match protocol was performed by international taekwondo coach. Equation 208-(0.7*age) for evaluating max HR was used.

Collect the blood sapling and hormonal analysis before, and immediately after exercise and one hour after exercise blood sampling was taken, then collected blood sampling and poured on the tubes, the tubes have K₃EDTA in them. Then the tubes was put on the ice and remained on the ambient temperature for a few minutes. Then by centrifuging for 10 minutes, with 3500 PRM round, serum separated from plasma. All blood sampling were kept frizzing at -20° centigrade temperature till reaching to laboratory. To exam in changes variables, from before till immediately after exercise and one hour after exercise we used ANOVA test analysis. T-test was used to determine probable sources of differences.

RESULTS

Table 1 shows statistical results with concern to the variables. As it can be seen in table 1, there wasn't significant changes at TSH amount (p>0.05). Although low primary increasing and returning to the amount of before of exercising at one hour of exercise was observed.

But significant differences was observed between 3 times of blood sampling (P<0.05) the different was between before and one hour after the exercise (P= 0.002). Also, this hormone increased immediately after exercise and also was continue low increasing one hour after exercise.

Also the amount of T₃ doesn't have increased significantly differences at 3 times of blood sampling (P>0.05). And we observed that this hormone primary increased no significant then was returned to amount of resting time.

Table 1: Statistic results studying on variables at 3 times sampling

Thyroid hormones	Before exercise	immediately after exercise	1 hour after exercise
T ₃	0.79±0.08	0.87±0.24	0.74±0.09
*T ₄	7.92±1.4	10.02±1.42	09.98±1.76
TSH	1.12±1.32	1.49±1.27	1.39±1.09

* Significant at P≤0.05

As it was observed, the amount of TSH didn't have significant changes (P>0.05). Although less primary increasing and return to the amount of before of exercising was observed in one hour after exercising. But significant

differences between 3 sampling times was observed in T_4 amount ($P < 0.05$). This differences was between before and one hour after exercise ($P = 0.002$). Also this hormone, after exercise was increased that also till one hour after exercise this increasing was less continued. T_3 amount hasn't significant differences with each other at 3 sampling times ($p > 0.05$). In this hormone primary no significant increasing and returning to resting time amount was observed.

DISCUSSION

According to present research findings, serum concentration didn't have significant changes before, till immediately after and one hour after exercise. However it has low increased immediately after exercise and has return one hour after exercise to amount of before of exercise. What is important is that the lack of significant changes of TSH serum in 3 times of blood sampling. Fortunato et al., (2008) were reported the lack of changes in TSH after exercising [17]. But Ciloglu et al., (2005) were reported the increase of changes in TSH after exercising [2]. We look at the intensity of exercise, in research which we talked about differences in result may be is related to exercise intensity [6,13].

Another researchers have reported that during long-term suitable exercise, T_4 was increased, which because of changes in concentrations of plasma free fatty Acid (FFA), glucose and other foods [3,24]. Also Foman (2012) have reported T_4 increasing [6]. Salami et al., (2012) have claimed that, increasing FT_4 instead of decreasing TSH after exercising maybe to some extent be counted for [21]. But in this research also TSH increased.

Also in present research the amounts of T_3 haven't significant different with each other in 3 times blood sampling. In this hormone no significant primary increasing and then returning to the resting amount hormone was observed. Anyway, according to statistic this changes wasn't significant. Fortunato et al., (2008) have shown significant increasing in T_3 serum [17]. Other researchers have reported that during suitable, long-term exercise the level of T_3 decreased [3,24]. The different between these results also probably is belonging to intensity and exercise duration.

Also Ppourvaghgar & Shahsavar (2009) have reported that after heavy exercise T_3 serum increased [15]. Mastorakos & Pavlatou (2005) observed in total T_3 and total T_4 and T_3/rt_3 ratio in rats immediately after exercise for 20 minutes run on the treadmill with compare to unmoving rats [11].

In human body high aerobic training which is performed in %70 MHR increase T_3 total, T_4 total and free T_3 and TSH have effected significantly, and in %90 maximum heart rate total T_4 , free T_4 and TSH increased but T_3 serum and free T_3 decreased significantly [2].

CONCLUSION

Due to increased T_3 , T_4 , TSH hormones which followed by taekwondo exercise with intensity of %70 MHR for one hour, it seems that doing exercise with this intensity and duration doesn't enter double pressure on body and can be used for health improvement and cardio-respiratory for all people.

REFERENCES

- [1] N. Behbu, 11th Asian Federation of Sports Medicine Congress, **2008**, 328.
- [2] F. Ciloglu, I. Peker, A. Pehlivan, M. K. Karacabey, N. Ilhan, O. Saygin, R. Ozmerdivenli, *Neuro Endocrinology Letters*, **2005**, 26: 830-834.
- [3] M.D. Deligiannis, M.D. Karamouzis, E. Kouidi, V. Mougios, M.D. Kallaras, *Br J Sport Med*, **1993**, 27.
- [4] A. Didari, M. Faramarzi, 8th International Sports Medicine Congress, **2012**, 54.
- [5] N. Fayama, 11th Asian Federation of Sports Medicine Congress, **2009**, 103.
- [6] M. Foman, 8th International Sports Medicine Congress, **2012**, 69.
- [7] S. Gullu, F. Altuntas, I. Dincer, C. Erol, N. Kamel, *Eur J Endocrinol*, **2004**, 150:655-661.
- [8] A.C. Hackney, R.G. McMurray, D.A. Judelson, J.S. Harrell, *Jpn J Physiol*, **2003**, 53:475-479.
- [9] J. Jahani, 11th Asian Federation of Sports Medicine Congress, **2008**, 93.
- [10] P. Koistinen, V. Martikkala, J. Karpakka, O. Vuoiteenaho, J. Leppaluoto, *J Sports Med Phys Fitness*, **1996**, 36:408-411.
- [11] G. Mastorakos, M. Pavlatou, *Hormone & Metabolic Research*, **2005**, 37: 577-584.
- [12] A.L. Maia, M.J. Berry, R. Sabbag, J.W. Harney, P.R. Larsen, *Molecular Endocrinology*, **1995**, 9: 969-980.
- [13] L. Nazari, A. Mohammadi, 8th International Sports Medicine Congress, **2012**, 159.
- [14] A. Pakarinen, K. Hakkinen, M. Alen, *J Sports Med Phys Fitness*, **1991**, 31:142-146.
- [15] M.J. Pourvaghgar, A. Shahsavar, *Digest J of Nanomaterials and Biostructures*, **2009**, 4: 263-267.

- [16] M. Rahae, F. Bahmani, H. Sobhani, *11th Asian Federation of Sports Medicine Congress*, **2008**, 403.
- [17] R. Soares Fortunato, D.L. Ignácio, A.L. Souto Padron, R.P. Anha, M.P. Marassi, D. Rosenthal, J.P.S. Werneck-de-Castro, D.P. Carvalho, *J of Endocrinology*, **2008**, 198: 347-353.
- [18] J.K. Rone, R.F. Dons, H.L. Reed, *Clinical Endocrinology*, **1992**, 37: 325-330.
- [19] E. Rostami, *5th International Physical Education & Sports Sciences Congress*, **2010**, 83.
- [20] H. Rupp, R. Wahl, *J Appl Physiol*, **1990**, 68: 973-978.
- [21] M. Salami, V. Rahimi, *8th International Sports Medicine Congress*, **2012**, 77.
- [22] J. Sonka, Z. Limanova, J. Neffeova, *Cas Lek Gesk*, **1990**, 129: 1421-1424.
- [23] R. Zarzeczny, W. Pilis J. Langfort, H. Kaciuba-Uscilko, K. Nazar, *J Physiol Pharmacol*, **1996**, 47:503-513.
- [24] F. Zillman, *11th Asian Federation of Sports Medicine Congress*, **2008**, 32.