**Reasoning of dissertation topic and competency of potential supervisor for admission onto joint LSU and TU doctoral studies in 2021**

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| **Area of research (title and code)** | Biomedical Sciences |
| **Field of research (title and code)** | Biology (01B) |
| **Topic of research** | Valsalva maneuver, stress scale, high intensity interval training, intraocular pressure, weightlifting |
| **Institution** | Lithuanian Sports University, Department of Coaching Science |

**Potential supervisor**

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| **Pedagogical and scientific degree** | **Name, surname** | **Academic position** |
| Prof. dr. | Vytautas Streckis | Lecturer, researcher |

**Short reasoning of proposed dissertation topic**

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| **Title** |
| High Intensity Interval Training on skeletal muscle strength and intraocular pressure variation during weightlifting |
| **Short research description (including aims and objectives) (maximum 1500 characters).**  Thus, our aim is to establish the effect of high intensity interval training for intraocular pressure and blood vessels’ diameter in the eye’s fundus by comparing different training and breathing regimes, frequency of athletes’ experienced load and range of organized exercises. Furthermore, we expect to examine variety ways of breathing efficiency for the intraocular pressure and for the vessels of eye ‘s fundus (exhale the air while being at the point of the concentric phase while lifting the weight and inhale at the point of eccentric phase while lowering the weight, also, lifting the same weight without breathing). Doing Valsalva maneuver (which involves forced exhalation before holding breath) there is a sudden pressure increase in bottom of the stomach which blocks venous blood to go back to the heart. Consequently, the average arterial pressure diminishes due to the lack of blood in the heart. This could lead to reflexive tachycardia. While a sudden exhalation is being done the pressure in the chest decrease, moreover, blood pressure level drops down significantly, therefore, we could notice a rise of pressure in the heart.  Aim: To estimate the effect of weightlifting exercises on the intraocular pressure. |
| **Relevance of the problem, its novelty at national and international level (maximum 1500 characters).**  People who often lift weights are in higher risk to make damage to the optic nerve and eye ‘s blood vessels elasticity. In very rare cases athletes or physically active people during the static exercises could even become blind (Awadalla et al., 2015). Pressure increase for people who have normally functioning eyes is not a considerable issue. However, people who have first signs of glaucoma or even have this disorder and do not know about it yet are in high risk to enhance this process over a long period of time. It might be that athletes who are in this type of situation could lose approximately 70 percent of their one eye ‘s peripheral vision and be unaware about emerged issue as another ‘s eye vision is compensating deficiency, consequently, it is more difficult to perceive the problem. If weightlifters or physically active people want to avoid unnecessary harm for their vision and optic nerve, they have to exercise very carefully and breathe correctly during exercises (Pal et al., 2013; Gonzalez, 2017).  Those kinds of research have not been done in Lithuania or even in the LSU except two (Solianik et al., 2019; 2020). However, the world’s scientists are carrying out the researches with physically active people by testing just their intraocular pressure. Furthermore, this type of research has not been done with professional athletes who are lifting weights. What is more, it has not been researched what is the impact of high intensity interval training on intraocular pressure and the blood vessels change in the eye’s fundus after weightlifting exercises. |
| **Research methods and possibilities for conducting these studies (maximum 1500 characters).**  Blood pressure by the Korotkov method;  Pulse oximeter PM A10;  The photo of the Eyes’ fundus with Aurora device;  Intraocular pressure – ICare tonometer. (ICP, Icare, IC-100);  Heart rate will be measured with Polar;  Chronic stress scale;  Subjective perception of load intensity (in 20 points system);  Fatigue estimation (in 10 points system);  Fasting glucose;  Lipids (cholesterol, triglycerides);  High Intensity Interval Training  Muscle strength |
| **Please indicate the links between the proposed topic for the doctoral thesis and biomechanics / physical therapy / sports study programs.**  Athletes often experience tremendous physical, emotional and psychological load during weightlifting. It is known that dynamical (for example, running) exercises extremely affect heart activity and cerebral bloodstream. However, during static (for instance, weightlifting) exercises blood pressure could reach approximately 450-380 mmHg, HR -166 bpm (Dickerman et al., 2000).  While athletes are dealing with physical exercises the blood stream in their retina vessels increases significantly (Bosch et al.,2009). Also, huge impact for the blood stream of the eye has hypoxia, which evolves during physical exercises (Zhang et al.,2012). What is more, intensive physical load can harmfully affect the blood stream autoregulation in brain which can lead to fainting or hemorrhagic stroke (Querido and Sheel, 2007). The authorised researches have shown that physical activity, for example, recently mentioned weightlifting in a gym can enhance the risk of blindness due to intraocular pressure which accelerates the process of glaucoma (Riva et al., 1997; Nordqvist et al., 2006; Awadalla et al., 2015). The researchers carried out that higher intraocular pressure occurs in Valsalva maneuver when a person is holding his breath while lifting a heavy weight, therefore, the pressure arises in the chest. This process occurs not only during weightlifting exercises but also while coughing or vomiting (Porth et al., 1984). |
| **Is the proposed topic for the doctoral thesis related to currently funded research projects? Please indicate the links between the proposed topic for the doctoral thesis and funded research projects**  No |
| **Is the proposed topic for the doctoral thesis related to joint research with a foreign institution? Please indicate the links between the proposed topic for the doctoral thesis and research with a foreign institution**  No |

Currently I am supervisor of \_\_0\_\_\_\_ doctoral students.

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| Supervisor |  | C:\Users\streckis\Desktop\Vyto duomenys\Straipsniai\Siusti straipsniai isiet sklero ryte ir vakare\Multiple sclerosis Journal 2012 06 20\vs01 parasas elektronin.jpg |  | Vytautas Streckis |

(signature) (Name, surname)

Date 2021 04 26