

Reasoning of dissertation topic and competency of potential supervisor for admission onto joint LSU and TU doctoral studies in 2019

Area of research (title and code)	Biomedicine
Field of research (title and code)	Physiology
Topic of research	Exercise physiology
Institution	Lithuanian Sports University

Potential supervisor

Pedagogical and scientific degree	Name, surname	Academic position
PhD	Sigitas Kamandulis	Head researcher, professor

Short reasoning of proposed dissertation topic

Title
<i>Making tendon stronger: the effect of training and collagen supplements on tendon (and muscle) structure and function</i>
<p>Summary</p> <p>The adaptation process of muscle-tendon unit is affected by both mechanical and environmental stimulus (Mersmann et al., 2014). In vivo ultrasound-based measurements of human adults' tendon have shown an increase in stiffness (Kubo et al. 2001, Bohm et al., 2014) and cross-sectional area (Kongsgaard et al., 2007; Seynnes et al., 2009) in response to training. Though the metabolic features and adaptive mechanisms and as a consequence the time course of adaptation differ between muscle and tendon. Studies reported that training with moderate loads can trigger increases of muscle strength and size (Mitchell et al., 2012; Schoenfeld et al., 2016), but do not provide a sufficient stimulus for tendon adaptation (Arampatzis et al., 2007, 2010; Kongsgaard et al., 2007). This can increase the mechanical demand upon the tendon and susceptibility to trauma (Arampatzis et al., 2007, 2010).</p> <p>It was suggested that tendons can be most effectively strengthened if loading regimen incorporate slow repetitive high-magnitude tendon strain application whereas plyometric exercise do not seem to consistently stimulate tendon adaptation (Mersmann et al., 2017). However, the effects of overall training volume, loading frequency and progression are basically unknown.</p> <p>We aim to compare different in exercise mode, loading frequency and range of motion exercise programs in order to establish the training effect on tendon and muscle morphology and functions. Secondly, we aim to investigate the effectiveness of collagen supplementation in tendon adaptation to exercise as nutrition in general and amounts and types of consumed proteins have been shown to have a great impact on strength training outcomes (Morton et al. 2018). During the study we will measure in detail quadriceps muscle and patellar tendon functional properties, cross-sectional area, stiffness, elasticity and release of mechanical strain energy in young adults' athletes. The results of the project will help identifying the most appropriate strategy of training with special attention paid to tendon health.</p>
Please indicate the links between the proposed topic for the doctoral thesis and health promotion / physical therapy / sports study programs.

It is related with sports study programs

Is the proposed topic for the doctoral thesis related to currently funded research projects?

No

Is the proposed topic for the doctoral thesis related to joint research with a foreign institution?

No

Currently I am supervisor of 5 (two students will graduate in September) doctoral students.

Supervisor

(signature)

(Name, surname)

Date 2019 m. kovo 12 d.