

## ABSTRACT

**Thesis title:** Electromyographic Analysis of the Shoulder Girdle Muscles Inclusion of Volleyball Players

**Problem definition:** Elite sport is very demanding, not only physically, but also mentally. The demands on the musculoskeletal system are often not compensated, especially in children and junior categories. The only targeted and regular compensation takes place at volleyball by the fitness training in the gym, but not always properly lead and adapted to the individual needs of athletes. The question is whether it is possible to prevent these problems. From my perspective, yes, the inclusion of appropriate compensation exercise in normal training session, which will require little equipment and time and to be functionally connected with volleyball technique that players do not lose the game performance. In the context of the thesis will be compared exercising of the second diagonal PNF for the upper extremity with an elastic resistance and simulated strike without the ball - volley lob, as an alternative fitness of exercises for volleyball players.

**Objectives:** The aim of the dissertation is based on the available literature to outline the issues of kinesiological and biomechanical relationships of the shoulder girdle in sports especially in volleyball, which is a typical representative of the so-called "overhead" sports and using surface electromyography to verify the similarity involvement of selected muscles in a typical volleyball movement - a lob and strength exercises on the basis of proprioceptive neuromuscular facilitation with elastic resistance for the upper limb. Based on the results of experimental studies will be designed practical recommendations to the training process.

**Methods:** A literature search was performed to obtain theoretical background of research. On the basis of a questionnaire drawn up for the purposes of the dissertation, was deliberately selected 12 male probands aged 20 to 29 years old of volleyball league level. The experiment was carried out using surface electromyographic sixteenchannel device Telemyo Mini by Neurodata with telemetric transmission. For the purposes of the experiment and based on the theoretical background of the work has been selected for the measurement following muscles: m. deltoideus pars anterior, m. deltoideus pars posterior, m. pectoralis major, m. trapezius pars ascendens, m. trapezius pars medialis, m. trapezius pars descendens and m. serratus anterior. Probands performed volley lob (simulated strike without the ball) and 2<sup>nd</sup> diagonal

by PNF for the upper extremity with an elastic resistance, flexion and extension pattern. The measured data was processed in the MyoResearch XP Master and analyzed using statistical methods (descriptive statistics, Leven's test, Kolmogorov-Smirnov test, Tukey's post-hoc test).

**Results:** The results of the dissertation clearly responded to the research questions. It was demonstrated similarity of the simulated strike without the ball and the 2<sup>nd</sup> diagonal of PNF for the upper extremity with an elastic resistance, we can also assume that we have chosen is appropriate strengthening exercises to prevent injury to the shoulder joint and this exercise could be included in fitness training for volleyball. Dissertation results moreover shown that in all probands increased muscle activity during the eccentric phase of the extension pattern of 2<sup>nd</sup> diagonal of PNF for upper limb, the use of eccentric contraction is described in the discussion of work. With a demonstrable effect of workout according to the concept of PNF for the upper extremity with an elastic resistance, this exercise is very useful not only for volleyball players, but also other "overhead" athletes, thanks to the similar motion trend.

**Key words:** shoulder girdle, volleyball, surface electromyography, proprioceptive neuromuscular facilitation, ballistic movements, fitness training, physical therapy, sports training, exercises with elastic resistance