

- Title:** Manifestation of cerebellar dominance in the form of extinction physiological syndrome on upper and lower limbs and its relationship to human laterality.
- Objectives:** The aim of this diploma thesis is to determinate size of relationship between manifestation of cerebellar dominance in the form of extinction physiological syndrome and preference of limbs.
- Methods:** A total of 27 individuals (male and female students of UK FTVS) were involved in the current quantitative research. We used indicators which were selected from Musalek's test battery (2013) to assess limb preferences. The evaluation of joint passivity asymmetry was based on angle and time parameters during walk and during controlled falls of forearm and shank on a constructed fall-machine. The movement was registered in real time by Qualisys Motion Capture System. For data analysis, descriptive statistics methods, paired t-test, level of statistical and substantive significance (Cohen's d) and tetrachoric coefficient of correlation were used.
- Results:** Our research suggests that there is no significant difference in joint passivity when comparing preferred and non preferred limbs. Though it is necessary to take into consideration specifics and the size of research sample in which everybody was an active athlete. The result of tetrachoric coefficient of correlation ($r = 0.54$) indicates a weak relationship with a number of unexplained residues between direction of joint passivity of preferred upper and lower limb. The data analysis of separated samples, for right-handed and left-handed respectively, detected an opposing direction of analyzed angle and time parameters with right-handers and left-handers. There was found out a subtle discrepancy about the declared hypothesis concerning lower muscle tone in the non preferred limb with right-handers, while left-handers were more likely in accordance with the hypothesis. The only observed parameter that showed statistically significant difference between the preferred and non preferred limb was a minimal angle achieved in the knee joint after a fall of shank, $p < 0.05$. The value of

statistical significance of this difference was in the direction of joint passivity against Henner's hypothesis (Cohen's $d = 0.58$). In case of left-handers, the difference in this evaluated parameter was also statistically significant, $p < 0.05$ (Cohen's $d = 0.46$). However this result was in accordance with Henner's hypothesis. The relationship between manifestation of cerebellar dominance in the form of extinction physiological syndrome on upper and lower limbs was not shown as conclusive. It is possible that cerebellum in the course of ontogenesis is greatly flexible and it can adjust to required function. Thus muscle tone could be modified by cerebellum in terms of impact from long-lasting impulses from outside environment. This initiator can be for example frequently performed movement activity or regular sport training.

Keywords: laterality, cerebellum, handedness, preference, extinction physiological syndrome, kinematic analysis