Abstract

Title: Comparative analyses of muscle activation lower extremities during running at different surface.

Objectives: The aim of this bachelor's thesis is to compare the level of activation of selected muscles of the lower extremities and the relative timing of these activations. Realize measurements on three types of surface: tartan, grass, sand and find out the differences in activations of selected muscles according to the surface.

Methods: In this thesis, we used the method of analysis and the method of comparison. We applied the analysis method in the analysis of the measured signals for the running step and the comparison method in the section comparing average running step cycles from different surface types.

Results: We found out that running on the tartan, acitvates all the monitored muscles in more than 75% of the average cycles within 10% of the running step time period. For tartan, grass and sand, we researched that the order of activated muscles is different, although the starts of activation are not different in time from each other within one stride cycle. On the tartan, the activation of the tibialis anterior and peroneus longus muscles in both lower ewtermities is comparably same long as in the heads of the gastrocnemius. On the sandy surface, a double activation occurred in the tibialis anterior. Both heads of the gastrocnemius were proportionally activated for longer periods of time when running on sand than on tartan.

Conclusion: By a healthy man, the muscles are activated during free running with almost the same activation time on average and with the timing of the activation of individual muscles relative to each other. Another important finding is that, based on research, it can approved that the tibialis anterior muscles are more involved in stabilization.

Keywords: running, surface electromyography, different types of surfaces, comparative analyses