

Abstract

Title: Electromyographic Analysis of the Different Handlebars Grips Effect on the Shoulder Blade Fixators

Aims: The main objective of this thesis is to carry out a methodological study on the impact of different handlebars grips on the shoulder blades fixators. Result of the grip change is not only reduction of the upper fixators activity and the increase in the lower fixators activity but also co-contraction index increase and muscle fatigue reduction. Based on the hypothesis we assumed that the highest activity rate of the lower blades fixators and the lowest activity rate of the upper blades fixators will be during the handlebars brakes grip. The highest co-contraction index will occur during the handlebar brakes grip and the maximum muscular fatigue will occur during the grip at the top of the handlebars.

The first part of the thesis is focused on the literature search and facts retrieval pertaining to the studied issue. In the second special part of the thesis we conducted a research during which the muscle activity of the upper and lower blade fixators was recorded. Three different handlebars grips were considered during the measurement using the cycle ergometer.

Methods: Muscle activity was scanned and recorded using surface EMG.

Maximal voluntary contraction of selected muscles based on the muscle test was measured followed by the measurement of the blades fixators muscle activity while using a cycle ergometer. Three different handlebars grips were considered. Each proband always rode for 3 minutes at 300 watts with a pedaling frequency of 90 rpm for each of the three considered handlebars grips. 10 minutes break to recover was used after each of the the considered handlebars grips. The trial involved 5 probands aged 21-27 years, one woman and four men. Probands who did not meet a given medical or sporting performance criteria were excluded from the trial.

Results: Muscle activity measuring showed that the lowest activity rate of the upper fixators occurred during the breaks grip. The highest activity rate of the lower fixators was recorded during the lower grip. Second highest activity rate of the lower fixators was recorded during the breaks grip. Measurement results showed that during the breaks grip the highest muscle co-contraction index was recorded for 2 probands of 5. No 13 compelling values of muscle fatigue were recorded.

Key words: Blades Fixators, Surface EMG, Cycling, Muscle Co-contraction, Muscle Fatigue, Muscle Activity