

NEUROMUSCULAR RESPONSES DURING THE PERFORMANCE OF A CHAIR RISING EXERCISE IN AQUATIC AND DRY LAND

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INTRODUCTION: In aquatic physiotherapy programs are used the functional tasks, which are quite important during the activities of daily living. Knowing the degree of muscular activation during the performance of these functional tasks is important for physiotherapists, in order to find out which can be used in each moment (on dry land or in water).

AIM: The purpose of the present study was to analyze the neuromuscular responses during the performance of a chair rising (CR) exercise in aquatic and dry land environments at the same cadences.

METHODS: 10 healthy subjects (five males and five females (mean \pm SD): age, 22.0 \pm 3.1 year; height, 172.8 \pm 9.0 cm; weight, 63.9 \pm 17.2 kg) were recruited for study. The procedure started with using a telemetry EMG system from the following muscles on the right side: the quadriceps –vastus medialis (VM), the quadriceps –rectus femoris (RF), the long head of the biceps femoris (BF), the tibialis anterior (TA), the gastrocnemius medialis (GM), the soleus (SOL), the rectus abdominis (RA) and the erector spinae (ES). After the MVC tests the subjects performed one set of five repetitions for the CR (47 cm) exercise on dry land with the right cadence (20 beats per minute). After the dry land procedure, the subjects performed the same task in the water inside a pool with a depth of 100 cm. The raw electromyography signal was recorded with a 1000Hz sampling frequency. Filtering of the raw EMGs was performed with lowZ and highZpass filters. Average EMG data were normalized to the greatest 1Zs average EMG during MVC from each muscle.

RESULTS: % MVC was different for all muscles during the (CR) exercise chair rising in water or dry land. Were significance higher on dry land than in water normalized signals from VM (17.3%), RF (8,8%), BF (4,3%), TA (13,9%), GM (3,4%), (SOL (6,2%). However, were higher in water than on dry land normalized signals from RA (Z26,6%) and ES muscles (Z22,6%).

CONCLUSION: Muscle activity tends to be lower in waterZbased compared to landZbased activity; however core muscles are showed higher activity. Findings have showed that a (CR) chair rising exercise in aquatic and dry land environments at the same cadences present different patterns of neuromuscular activity. This should be considered in the clinical and research implications.