

## MUSCLE ACTIVATION ANALYSES OF DIFFERENT CARDIO MACHINES

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### INTRODUCTION

Cardio machines have been the object of study for many years. These machines are used by all walks of life to improve and maintain health from the common person, the athlete to the senior citizen. Lower body strength is essential for daily function. In order to better understand the muscle activity recruitment of the elliptical, wave and the helix inward and outward cardio machines this study investigated the stance and swing phase while analyzing EMG of the rectus femoris (RF), gluteus medius (GM) and the adductor magnus (ADM) muscles.

### METHODS

Six collegiate athletes volunteered for this study. EMG signaling was collected by Biopac multifunctional Biological Analyzer and Acqknowledge computer software was used for further analysis.



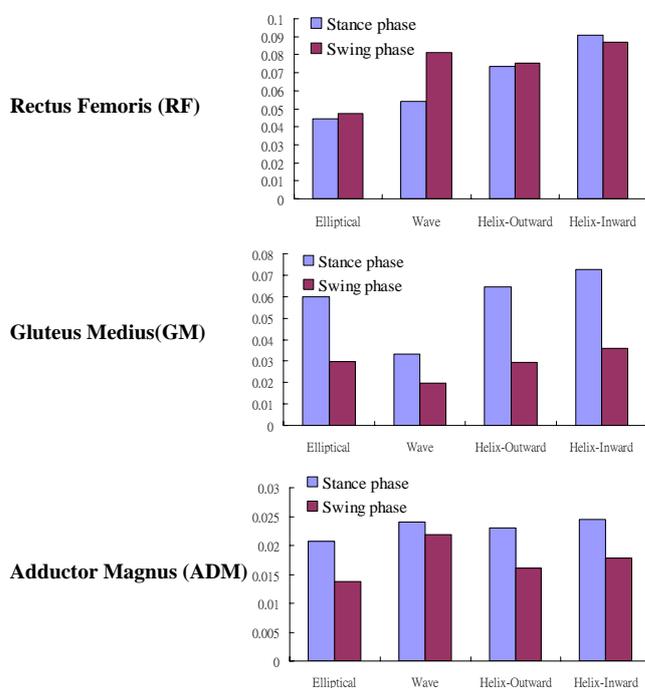
### RESULTS AND DISCUSSION

This study looked at the stance and swing phase muscle activation of the elliptical, wave and helix outward and inward movements while collecting EMG data of the RF, GM and the ADM. Results represented in graph 1 indicate that in the stance phase RF EMG activation of the wave, helix outward and inward movement, were significant over the elliptical also the helix inward showed significance over the wave to indicate the greatest RF recruitment of the groups tested. In the swing phase the wave, helix outward and inward indicated greater EMG activation over the elliptical trainer.

In figure 2 when comparing the G.M. in the stance phase results indicated that the elliptical, helix outward and inward recorded greater EMG readings over the wave. Furthermore, the helix inward recorded higher EMG readings over the helix outward.

In the swing phase GM EMG recordings of the elliptical, helix inward and outward were greater than the wave. The helix inward was greater than the helix outward.

Figure 3 represents ADM EMG results. In the stance phase there was no significant difference between the machines. However in the swing phase the wave was significantly greater than the elliptical and helix outward, and the helix inward was greater than the elliptical.



**Figure 1,2,3** Comparison between the Elliptical, Wave, Helix-Outward, Helix-Inward : the EMG of RF 、GM 、ADM in stance phase and swing phase.

### CONCLUSIONS

If the results are looked at as a whole and not collectively for the RF it can be seen that during the stance and swing phase the RF is equally active in both phases, with the exception of the wave. Collective the helix inward indicates the highest EMG readings. Results for the GM on the other hand are more active in the stance phase in all machines and less active in the swing phase. Finally, the ADD as a whole is active in both phases but still favoring the stance phase more. To fully understand these results further studies are being conducted.

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