EMG ANALYSIS OF LOWER EXTREMITIES MUSCLE RECRUITMENT PATTERNS DURING OPEN KINETIC CHAIN AND CLOSED KINETIC CHAIN EXERCISES

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INTRODUCTION: "Closed kinetic chain" (CKC) exercise has become popular in the last 10 years for use after anterior cruciate ligament (ACL) reconstructive surgery. Closed kinetic chain exercises appear to have gained popularity over more traditionally used open kinetic chain (OKC) exercises because many clinicians believe that CKC exercises are safer and more functional[1]. Recently various types of CKC exercise method have been developed[2]. However, comparison of the EMG activity and fatigue patterns of lower extremity muscles during OKC and CKC was not reported. There is a concern that exercises, if prescribed too soon or aggressively, may be detrimental to the reconstructed graft due to muscle fatigue. The objective of this study was to investigate the effects of kinetic chain conditions on the EMG activities of lower extremities.

MATERIALS AND METHODS: Sixteen healthy young male subjects aged 20 to 22 years (21.4 ± 0.7) were tested. CYBEX 6000 isokinetic dynamometer was used to measure open and closed concentric torque generated by the right lower extremity. After informed consent was received, each subject was instructed to exert isometric maximal voluntary effort in OKC knee extension.

RESULTS: The most remarkable observation of this study was the EMG activities of rectus femoris. The CKC knee extension generated approximately twice as much knee extension torque as OKC knee extension while CKC knee extension generated approximately half as much rectus femoris activity as OKC knee extension.

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Reference