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Effect of the shoulder position on the biceps brachii emg in different dumbbell curls

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ABSTRACT

Incline Dumbbell Curl (IDC) and Dumbbell Preacher Curl (DPC) are two variations of the standard Dumbbell Biceps Curl (DBC), generally applied to optimize biceps brachii contribution for elbow flexion by fixing shoulder at a specific angle. The aim of this study is to identify changes in the neuromuscular activity of biceps brachii long head for IDC, DPC and DBC exercises, by taking into account the changes in load moment arm and muscle length elicited by each dumbbell curl protocol. A single cycle (concentric-eccentric) of DBC, IDC and DPC, was applied to 22 subjects using a submaximal load of 40% estimated from an isometric MVC test. The neuromuscular activity of biceps brachii long head was compared by further partitioning each contraction into three phases, according to individual elbow joint range of motion. Although all protocols elicited a considerable level of activation of the biceps brachii muscle (at least 50% of maximum RMS), the contribution of this muscle for elbow flexion/extension varied among exercises. The submaximal elbow flexion (concentric) elicited neuro muscular activity up to 95% of the maximum RMS value during the final phase of IDC and DBC and 80% for DPC at the beginning of the movement. All exercises showed significant less muscle activity for the elbow extension (eccentric). The Incline Dumbbell Curl and the classical Dumbbell Biceps Curl resulted in similar patterns of biceps brachii activation for the whole range of motion, whereas Dumbbell Preacher Curl elicited high muscle activation only for a short range of elbow joint angle.

Key words: Biceps curl, EMG, biceps brachii.

Key Points

- The Incline Dumbbell Curl and the Dumbbell Biceps Curl resulted in a considerable neuromuscular effort throughout the whole elbow range of motion.
- The Incline Dumbbell Curl and the Dumbbell Biceps Curl may be preferable for the improvement of biceps brachii force in training programs.

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