The Bicep Curl and the Reverse Bicep Curl

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Technique

Resistance for this exercise is provided by a barbell when performed bilaterally, and a dumbbell when executed unilaterally. While the range of movement for both the bicep curl and reverse bicep curl are identical, the hand position is opposite, the former utilizing an underhand or supinated grip, and the latter utilizing an overhand or pronated grip. In order to maximize the resistance via gravity, the long axis of the arm should be at a right angle to the floor. Throughout the lift, the weight is grasped as tightly as possible and the wrist is held neither flexed nor extended, but in neutral position. The curl is performed through full elbow flexion, but is initiated on each repetition from a position just short of full elbow extension. For a bicep curl, forearm supination is maintained through the entire movement; likewise for a reverse curl it is pronation maintained throughout.

Stabilization of the shoulder and trunk musculature is a prime concern. When the curl is executed unilaterally, one must concentrate on keeping the shoulder perfectly still, unless the upper arm is resting firmly on a support. If a barbell is used, the lifter must stabilize the trunk by keeping the back and buttocks in contact with a pillar or buttress.

Biomechanics

If one considers that the biceps brachii has its attachments just distal to (below) the elbow, and superior to (above) the shoulder, it would seem that the ideal range of movement is from an initial position of shoulder and elbow extension to shoulder and elbow flexion. This range of resistance is quite impossible to achieve using conventional loose weights, yet may be, in part, achieved through weight machines capable of offering resistance at all points through the lift. The following discussion, however, will be limited to an analysis of the bicep curl utilizing loose weights.

Structurally, the bicep brachii is divided at its belly by a septum into which fibers from either side attach. This division is consistent with the dual tendinous structure consisting of a short head which attaches proximally to the top of the shoulder socket, and a long head which attaches more medially to the coracoid process of the scapula. When the bicep curl is initiated, the long head contracts to stabilize the shoulder joint, while the short head exerts a flexion and strong supination force. The pronator teres must contract simultaneously to counter balance supination and assist flexion. The biceps brachii and the underlying brachialis share almost equally the work in elbow flexion during a bicep curl.1 The brachioradialis, radial and ulnar flexors, and flexor digitorum superficialis assist the movement. When the weight is grasped tightly and held in neutral position, the wrist and finger flexors must also work. Thus, the muscles of the front of the forearm and upper arm are developed.

Pronation of the wrist before initiating movement accounts for changes in muscle mechanical alignment which distributes the flexion load quite differently. The mechanical advantage of the biceps brachii is impaired as the tendon is wrapped around the radius and the effective lever arm decreases. The brachioradialis is most effective in neither pronation nor supination, but in neutral position, so is relatively unaffected by changing grip. It is during the reverse curl that the brachialis carries most of the load and is thus isolated. Owing to the loss of biomechanical efficiency which occurs in pronation, maximum force developed during a reverse curl is somewhat less (66-82%) of that exerted in the bicep curl.2 The reverse curl has the component of isometric wrist extension to maintain neutral wrist position in addition to isometric finger flexion to hold the weight.

In summary, then, both the bicep curl and reverse bicep curl develop elbow flexors. In the former, the pronator teres and biceps brachii are isolated, though various other muscles (brachialis, brachioradialis) are also prime movers. The net effect of the reverse curl is to lessen the assistance of the bicep brachii, and thus isolate the brachialis.

2. Ibid.
3. Ibid. @

![Diagram of bicep and brachioradialis muscles](attachment:image.png)