The purpose of this study is to compare the muscle activity and performance in a neutral and supinated grip bicep curl.

Methods

Protocol:
This experiment was a 1 day session. Participant’s demographics (height, weight, and age) were measured prior to the experiment. The participants were prepped and cleaned for EMG placement. EMG sensors were placed on the subject's brachioradialis and bicep branchii. After the participant's EMG sensors were placed, the participant was stationed on the Biodex dynamometer where the participant is comfortable. The participant performed an isotonic elbow flexion at 90 degrees with a neutral grip. The participant performed 3 trials of this with a 2 minute rest period in between. After the participant completed the isotonic test, they performed a neutral grip isokinetic elbow flexion test at 90 degrees/second with the same number of trials and rest period. After the participant finished both isotonic and isokinetic tests, the participant performed the same tests with a supinated grip instead of a neutral grip.

Results

Table 1: Subject Demographic Data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
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</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>178.2 ± 5.9</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>79.8 ± 10.4</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>23.6 ± 1.1</td>
</tr>
</tbody>
</table>

The mean values and standard deviation for the subject’s demographics is listed on Table 1. Figure 1 showed the comparison of the brachioradialis’s average EMG activity during the first 40° of both bicep curls. The mean value for a neutral grip bicep curl was 565.17 ± 163.803 μvolts and 541.80 ± 165.46 μvolts during a supinated bicep curl (p > .05). Figure 2 showed the comparison of average torque during the first 40° of both bicep curls. The mean value for a neutral grip bicep curl was 165.46 ± 200.96 N·m and 147.00 ± 199.03 N·m during a supinated grip bicep curl (p > .05). Figure 3 showed the comparison of average power during the first 40° of a bicep curl. The mean value for a neutral grip bicep curl was 6.14 ± 2.54 watts and 5.34 ± 1.74 watts during a supinated grip bicep curl (p > .05). Figure 4 showed the comparison of the brachioradialis’s MVC% during the first 40° of both bicep curls. The mean value for a neutral grip bicep curl was 67.70 ± 9.08% and 63.84 ± 8.19% during a supinated grip bicep curl (p > .05).

Conclusions

The study yielded no significant difference between the muscle activity and performance during a supinated and neutral grip bicep curl. Most studies supported this conclusion. The literature stated that the brachioradialis acted mostly as a synergist muscle during neutral and supinated elbow flexion at heavy loads. Various literature stated that when performing a bicep curl in a pronated hand position, there was a noticeable increase in muscle activity on the brachioradialis due to the bicep branchii at a biomechanical disadvantage to perform an elbow flexion. This can inferred that during a neutral and supinated bicep curl, the bicep branchii is at an optimal position to perform both bicep curls efficiently. The brachioradialis did not have to activate as much when compared to a pronated grip bicep curl.

Abstract

Purpose

The purpose of this study is to compare the muscle activity and performance of the brachioradialis during a supinated and neutral grip bicep curl.

Methods

System 3 Biodex Dynamometer
Torque
Power
Delsys Bagnoli EMG System
EMG
Microsoft Excel

Variables Measured:
• Average Brachioradialis Electromyography (EMG) activity (0-40° ROM)
• Average Torque (0-40° ROM)
• Average Power (0-40° ROM)
• Maximal Voluntary Contraction Percentage (MVC%) (0-40° ROM)

Subject
• 5 male participants
• UTA Students
• Exercised at least 3x a day

Instrumentation:

Results (cont’d)