Comparisons of Core Muscle Activity Between Back Squat and Push Press

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Background

- Previous research has been done exhibiting the fact that core strengthening leads to performance enhancement, postural improvement, and decreased risk of low back pain (1).
- There are a wide variety of exercises that aim to provide such training.
- Previous studies have looked at the activation of core trunk muscles while performing sit-ups using different abdominal devices (2).
- To date, no known studies have looked at the activation of core trunk muscles compared between the back squat and push press, two traditional weightlifting movements.

Purpose

- The purpose of this study was to determine if there is a difference in muscle activation when performing a push press versus a back squat.

Methods

- Male varsity athletes (n=10) who regularly trained with Olympic barbell performed seven to ten repetitions of a push press and a back squat set to a metronome at 50 cycles per minute for each repetition.
- Electrodes were placed on the Rectus Abdominis (RA), Erector Spinae (ES), and External Obliques (EO) muscles in order to monitor muscle activity through electromyography (EMG) with wireless transmitters (3).
- Subjects performed seven to ten repetitions of push press and back squat with the Olympic Barbell and in a randomized order at 30% of their 1RM.
- After finishing, subjects performed a max voluntary contraction (MVC) of a squat.
- The squat and Push press lifts were normalized to the MVC voltage. Data were analyzed using paired T-test.

Results

- The results presented in the following table are expressed means +/- standard deviations as a percent of MVC.

<table>
<thead>
<tr>
<th></th>
<th>RA</th>
<th>ES</th>
<th>EO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squat</td>
<td>110.37 ± 20.13 *</td>
<td>61.22 ± 5.1</td>
<td>51.55 ± 6.13</td>
</tr>
<tr>
<td>Push Press</td>
<td>56.32 ± 25.41 *</td>
<td>73.07 ± 23.83</td>
<td>45.73 ± 39.93</td>
</tr>
</tbody>
</table>

- Significant differences were observed for RA tested relative to %MVC for each when comparing the Squat to PP. *denotes significance at p < 0.014

Conclusion

- The results of this study suggest that muscle activity in the muscle group Rectus Abdominis may be greater when performing a Squat vs. PP.

Future and Current Studies

- Comparison of Muscle Activity Between the Tsunami Barbell and an Olympic Barbell
- Comparison of Core Muscle Activity Between Tsunami Barbell and Olympic Barbell for Squat and Push Press

References


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