The greater the number of wins the greater the peak torque levels of shoulder internal rotators power of dominant hand in amateur boxing athletes

Dear Editor-in-Chief

Boxing is a combat sport that demands both mental and physical competencies. In line with other active individuals (3), boxers should demonstrate – *inter alia* – optimal strength, stamina, endurance, coordination, speed and agility (1). The aim of the amateur boxer is to score the required points and to win the round by delivering clear punches to opponent’s target areas using different strategies and tactics. The boxing punches are three types, a) straight, using the lead arm also referred jab and with the rear arm cross, b) hook, c) uppercut. During the initial segments of the straight and hook punches we witness the engagement of the internal rotators, while external rotators are involved in the uppercut punches; the reverse occurs and to the end of these three movements.

Internal and external shoulder rotators stabilize the rotator cuff and maintain shoulder joint stability and integrity throughout the range of movements, that included in the straight, hook and uppercut punches (7). Amateur boxers often suffer shoulder injuries, perhaps due to relatively weak musculature (5, 8, 9).

The isokinetic dynamometer is an accepted modality used to assess functional parameters of antagonist/agonist muscles in different physical activities (2, 4, 5). However, we have found...
no published data on shoulder rotator muscle dynamometry in relation to amateur boxing. Therefore, we set to bridge this literature gap by examining 35 amateur boxers (aged 24.52±4.85 y; height 1.74±6.42 cm; body weight 76.52±11.1 kg) who volunteered to participate in this study. All volunteers gave signed consent to participate and declared no shoulder joint injury. The Peloponnese University Ethics Committee approved the study.

The Kin-ComTM (Chattecx, Chattanooga, TN) dynamometer was used for the determination of the peak torque of the internal rotators of the dominant hand, during concentric and eccentric contractions, at the angular velocities of 60, 120 and 180°/sec. The range of motion during the tests for the internal rotation was from 90° to 0° and from 0° to 90° for the external rotation. The number of wins during boxing competition for each participant was also considered.

**Table 1.** Mean (± SD) peak torque of dominant hand measures for amateur boxing athletes and significance between them (Values are presented in Nm).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>0-5 wins</th>
<th>6-10 wins</th>
<th>&gt;10 wins</th>
</tr>
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<tbody>
<tr>
<td>INT ROTATION CONCENTRIC 60°/sec</td>
<td>37.24±8.54</td>
<td>40.10±8.94</td>
<td>46.69±7.43*</td>
</tr>
<tr>
<td>EXT ROTATION CONCENTRIC 60°/sec</td>
<td>31.26±7.30</td>
<td>33.17±6.91</td>
<td>39.04±6.50†</td>
</tr>
<tr>
<td>INT ROTATION CONCENTRIC 120°/sec</td>
<td>27.27±6.90</td>
<td>30.55±6.79</td>
<td>34.72±6.51</td>
</tr>
<tr>
<td>EXT ROTATION CONCENTRIC 120°/sec</td>
<td>18.90±4.26</td>
<td>22.93±2.70</td>
<td>22.58±4.10‡</td>
</tr>
<tr>
<td>INT ROTATION CONCENTRIC 180°/sec</td>
<td>14.80±3.65</td>
<td>17.17±1.56</td>
<td>18.76±3.35**</td>
</tr>
<tr>
<td>EXT ROTATION CONCENTRIC 180°/sec</td>
<td>12.91±3.53</td>
<td>15.72±1.89</td>
<td>16.91±3.34‡²</td>
</tr>
</tbody>
</table>

* *p<0.031 (Between 0-5 wins and >10 wins).
† *p<0.034 (Between 0-5 wins and >10 wins).
‡ *p<0.023 (Between 0-5 wins and 6-10 wins).
** *p<0.033 (Between 0-5 wins and >10 wins).
‡‡ *p<0.027 (Between 0-5 wins and >10 wins).

Analysis of variance revealed significant differences between the number of wins during boxing competition and the peak torque at: (i) concentric contraction of internal rotators at the angular velocity of 60°/sec (F=3.79, p<0.03), (ii) eccentric contraction of internal rotators at the angular velocity of 60°/sec (F=4.48, p<0.02), (iii) concentric contraction of external rotators at the angular velocity of 60°/sec (F=4.0, p<0.03), (iv) concentric contraction of external rotators at the angular velocity of 120°/sec (F=3.91, p<0.031), (v) during eccentric contraction of external
rotators at the angular velocity of 120°/sec (F=4.45, p<0.020), (vi) during concentric contraction of internal rotators at the angular velocity of 180°/sec (F=4.99, p<0.013), and (vii) during concentric contraction of external rotators at the angular velocity of 180°/sec (F=5.21, p<0.01). Post hoc analysis with Bonferroni method revealed that boxers with more wins displayed statistically significant higher peak torque in the above parameters (for details see table 1).

It was concluded that the greater the number of wins, the greater the peak torque levels of shoulder internal rotators power of dominant hand in amateur boxing.

REFERENCES


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