THE EFFECTS OF COMBINED GENERAL, SPECIAL, AND SPECIFIC RESISTANCE TRAINING ON PACE BOWLING SPEED AND ACCURACY

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Background

Physical capacities can be developed through ‘general’, ‘special’, and ‘specific’ resistance exercises (1, 2). General resistance exercises are used to develop maximal strength of the muscles required to bowl quickly (e.g., pull-up), whereas special resistance exercises develop muscular power (e.g., medicine ball throws). Specific resistance exercises biomechanically mimic the sporting activity. Resistance training interventions in cricket and baseball have typically included exercises of only one classification (i.e., general or special or specific). These studies have reported statistically significant improvements in bowling or throwing velocity ranging from 2.4–6.0% (3, 5). The combination of general, special, and specific resistance exercises in one mesocycle however, has been shown to significantly improve baseball throwing velocity by 5.6% (6). Currently it is not understood whether a similar training approach would enhance pace bowling speed and accuracy, which are key elements to cricket bowling performance (7). The purpose of this study was to determine the effects of combined general, special, and specific resistance training on pace bowling speed and accuracy.

Methods

Twelve male community-standard pace bowlers (A and B grade cricket), aged: 23.7 ± 7.5 years, pace bowling experience: 7.1 ± 4.7 seasons, resistance training experience: 1.5 ± 2.9 years, participated in this study.

Bowlers completed an eight week training intervention (2 sessions per week), either in the combined resistance training (CRT) group or a traditional cricket training (TCT) group. The CRT group completed general, special, and specific exercises through pull-ups, sprints (resisted and unresisted), and bowling (heavy ball and regular ball) respectively (Figures 1 & 2). The TCT group served as controls, and completed unresisted sprint training and regular-ball bowling only.

Both groups performed a four-over pace bowling test before and after the training block (Figure 3). A radar gun captured bowling speed data, and mean radial error was measured as distance from ball strike to intended target on Dartfish to represent bowling accuracy.

Results

The combined resistance training group displayed a small improvement in peak and mean bowling speed relative to the traditional cricket training group. However, a large increase in mean radial error was evident in the combined resistance training group, indicative of poorer bowling accuracy (Table 1).

Table 1. Comparison in pace bowling speed and accuracy measures between the combined resistance training (CRT) group and the traditional cricket training (TCT) group. Data are presented as mean ± standard deviation. Note, the effect size compares the difference in change scores (post-pre) between groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>CRT Group (n = 6)</th>
<th>TCT Group (n = 6)</th>
<th>ES</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak BS (m/s⁻¹)</td>
<td>29.1 ± 1.8</td>
<td>30.0 ± 2.1</td>
<td>0.37</td>
<td>Small</td>
</tr>
<tr>
<td>Mean BS (m/s⁻¹)</td>
<td>28.4 ± 2.2</td>
<td>29.3 ± 2.1</td>
<td>0.34</td>
<td>Small</td>
</tr>
<tr>
<td>Mean RE (cm)</td>
<td>41.9 ± 5.2</td>
<td>50.8 ± 7.3</td>
<td>1.25</td>
<td>Large</td>
</tr>
</tbody>
</table>

BS, bowling speed; RE, radial error; ES, between-group effect size.

Discussion & Practical Applications

The prescription of heavy ball bowling and pull-up training in the CRT group may have improved fast twitch motor unit size and/or functionability (i.e., synchronisation, firing rate, recruitment) in the latissimus dorsi and pectoralis major, potentially enhancing peak and mean bowling speed. However, heavy-ball bowling is likely to negatively transfer to bowling accuracy due to its biomechanical specificity to the pace bowling motion (i.e., motor pattern, joint angles, and movement speeds). The overload in cricket ball mass of 60.3% (250-g ball) and 92.3% (300-g ball) in this study is far greater than the recommended 20% overload (2, 7). An implement too heavy is likely to modify the motor unit recruitment pattern in the central nervous system (2), and thereby impact technique (4).

Coaches are advised to prescribe more general and special exercises (e.g., bench presses, pull-ups, medicine ball throws, and 20-m sprints) to develop strength and power if seeking to improve bowling speed without harming bowling accuracy. Specific training can still be completed but it is recommended that only a regular-mass cricket ball is prescribed.

References


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