Abstract

PURPOSE: Forwards are regularly substituted within the sport of rugby union. There is currently limited information on how these effects movement patterns in rugby union match play. This study investigated how the movement patterns and pacing strategies of forwards that play the whole game in contrast with forwards inserted as substitutes in the second half.

METHODS: Global positioning system (GPS) data were collected during professional rugby union match play. Second half data for 19 whole game (WG) players and 17 substitute (Sub) players were compared in terms of relative total and high-intensity (>4 m·s⁻¹) distance, maximum speed (m·sec⁻¹) and sprint (>6 m·s⁻¹) frequency. The practical and ethical approval was granted by the University of Johannesburg Ethical Review Board.

RESULTS: Substitute forwards displayed increased high-intensity running distance (12 ± 6 vs. 9 ± 4 m·min⁻¹, likely medium), sprint frequency (1 every 13 ± 25 min vs. 1 every 20 ± 25 min, likely medium), maximum speed (1 every 7 ± 9 min vs. 1 every 13 ± 7 min, likely small) and sprint frequency (1 every 7 ± 9 min vs. 1 every 13 ± 7 min, likely small) vs. whole game players. Differences in movement variables were larger when substitutes were first introduced, but were not different in later quartiles. CONCLUSIONS: Whole game players adopted a “flat” pacing strategy in the second half, while substitutes adopted a “one bout, all-out” approach. The impact if substitutes on game movement patterns is meaningful, but short-lived. Differences between whole game and substitute players were negligible in the latter phases of the game.

PRACTICAL APPLICATION: The introduction of forward substitutes increases match intensity temporarily. This effect could be accentuated by introducing multiple substitutes at once, and may have tactical applications with coaches saving their substitutes for critical moments within the game.

Introduction

Rugby union is a full contact sport defined by repetitive bouts of short duration maximal effort activity (sprinting, tackling and contesting rucks), interspersed with periods of low-intensity activity (sprinting, tackling and contesting rucks), interspersed with periods of low-intensity activity. Rugby forwards are exposed to more contact activities more regularly than backs during activity (sprinting, tackling and contesting rucks), interspersed with periods of low-intensity activity (sprinting, tackling and contesting rucks) in the 2013 rugby season. All players signed informed consent and ethical approval was granted by the University of Johannesburg Ethical Review Board.

METHODS

Global positioning system (GPS) data were collected during professional rugby union match play. Second half data for 19 whole game (WG) players and 17 substitute (Sub) players were compared in terms of relative total and high-intensity (>4 m·s⁻¹) distance, maximum speed (m·sec⁻¹) and sprint (>6 m·s⁻¹) frequency. Given the practical nature of this study, likelihood of effects being true was assessed via magnitude-based inference and the Cohen’s effect size (ES) statistic and likelihood of effects being meaningful was assessed via effect size and Cohen’s (1988) ES statistic.

Results

TABLE 1: Movement variables of Whole Game or Substitute forwards in the second half of professional rugby match play.

<table>
<thead>
<tr>
<th>Movement Variable</th>
<th>Whole Game</th>
<th>Substitute</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative distance</td>
<td>65.8 ± 8</td>
<td>67.9 ± 10</td>
<td>Small (0.22)</td>
</tr>
<tr>
<td>High-intensity (m–s⁻¹)</td>
<td>9 ± 4</td>
<td>12 ± 6</td>
<td>Likely (0.66)</td>
</tr>
<tr>
<td>Maximum speed (m·sec⁻¹)</td>
<td>7.3 ± 1.3</td>
<td>7.1 ± 1.4</td>
<td>Trivial (0.15)</td>
</tr>
<tr>
<td>Sprint frequency (m·sec⁻¹)</td>
<td>25 min</td>
<td>25 min</td>
<td>Likely (0.67)</td>
</tr>
<tr>
<td>Acceleration frequency</td>
<td>9 ± 2.7</td>
<td>9 ± 3.5</td>
<td>Small (0.56)</td>
</tr>
</tbody>
</table>

Practical Applications

The introduction of substitute forwards temporarily raises match intensity. This finding may have tactical applications if coaches time the use of their substitutes to correspond with critical moments within the game.

Conclusions

These higher-intensity exertions are not sustained throughout the playing bout, and by the end of the game there is no longer a difference in the physical output of whole game and substitute players. This indicates that substitutes adopt a “one-bout, all-out” pacing strategy.

References


Appendix A

FIGURE 1: Percentage difference in key movement variables of Whole Game (WG) or Substitute (Sub) forwards across second half quartiles in professional rugby match play.