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# **Observed versus Expected Match-Running Outputs of International Female Rugby Sevens Players**

A thesis submitted to Massey University, Albany, New Zealand,  
in fulfilment of the requirements for the degree of  
**Master of Sport and Exercise**

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**2018**

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## **Abstract**

Women's rugby sevens is a new and emerging sport with limited knowledge, specifically on international female match-running outputs. It is a rare opportunity to conduct research on elite athletes, and even more so for an emerging women's sport. The overall aim of this thesis is to establish and compare observed international female rugby sevens players' match-running outputs versus theoretical expected match-running outputs (elite male players and an established sport, football). Another unknown aspect of the women's rugby sevens game is how fatigue affects performance. The thesis also determines differences in match-running outputs of international female rugby sevens players from half-to-half, game-to-game and tournament-to-tournament.

Global Positioning System (GPS) units worn on the players' backs were used to collect data from 18 female rugby sevens players across 15 matches and 19 female football players across four matches. Reasons for the gaps found in match-running outputs and aspects that could be improved for optimal elite performance in female rugby sevens were explored. The match-running output measures included low-to-moderate speed running (LMSR <16.5 km), high speed running (HSR >16.6 km), sprints (>21 km) and total distance (TD). These speed thresholds represent previously used zones in rugby sevens match analysis, as well as recommended zones for female sport settings (VX View software).

When compared with the expected match-running output measures, male and female rugby sevens players exhibited a large sex performance gap with male players recording more metres across all four measures, LMSR 64.8% ( $p < 0.01$ ), HSR 95.9% ( $p < 0.01$ ), TD 69.3% ( $p < 0.01$ ) and sprints 100% ( $p < 0.01$ ). Female football players and male football players demonstrated an unexpected sex performance gap in HSR of 152.3% ( $p < 0.01$ ), with male players performing more HSR metres. There was a smaller gap in TD 25.3% ( $p < 0.01$ ) and sprints 52.9% ( $p < 0.01$ ) and within the established performance gap for LMSR 2.3% ( $p = 0.28$ ) between male and female footballers, again with male players recording more metres.

There were no significant decreases in match-running outputs for female rugby sevens players from 1<sup>st</sup> half to 2<sup>nd</sup> half. However, female football players showed a significant decrease in match-running output in LMSR ( $p<0.01$ ), TD ( $p<0.01$ ) and sprints ( $p<0.01$ ) from 1<sup>st</sup> half to 2<sup>nd</sup> half. There were significant differences in match-running output in LMSR ( $p<0.01$ ) for female rugby sevens players, specifically with an increase between tournaments 2 and 3 ( $p<0.05$ ) and tournaments 1 and 3 ( $p<0.05$ ). There were also significant differences in the number of sprints performed ( $p<0.01$ ), with an increase between tournaments 1 and 2 ( $p<0.05$ ), and a decrease between tournaments 2 and 3 ( $p<0.05$ ), and a decrease between games 7 and 11. There were no significant differences in match-running outputs for female football players from game to game.

Overall, the findings from this thesis contribute to the limited knowledge on women's rugby sevens, specifically observing international female match-running outputs. The findings suggest that international female rugby sevens players have significant room to improve overall match-running outputs, aligning more closely with the expected sex performance gap (5-12%) and the established elite sport of football.

## **Acknowledgements**

Firstly, I would like to thank my supervisors, Associate Professor Andrew Foskett and Associate Professor Ajmol Ali. Your continuous effort, advice and guidance have been crucial. Andy, I genuinely cannot thank you enough for your support throughout this process. Although being based overseas posed its challenges, your ongoing support and readiness to communicate with me through the different time zones made it all possible. Aj, your attention to detail is unparalleled and your willingness to guide and encourage me has been amazing.

I would like to thank all those involved - teams, players and staff alike for their participation and support of this project. I also wish to acknowledge both Brad Anderson and Harriet Steele for their support.

Recognition must go to High Performance Sport New Zealand (HPSNZ) for their financial support in the form of a Prime Minister's Athlete Scholarship, and to Carolyn Donaldson for providing valuable guidance and encouragement throughout.

Last but by no means least, my thanks and gratitude go to my family for their unfailing support in all that I do.

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