



The effect of strength training on sprint performance in female team-sport athletes: A systematic review and meta-analysis



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Introduction

There has been a rise in the participation, professionalism, and profile of female sports in recent years. Sprinting ability is an important quality for successful athletic performance in many female team-sports. However, much of the research to date on improving sprint performance in team-sports is derived from studies with male participants. Given the biological differences between the sexes, this may be problematic for practitioners when programming to enhance sprint performance in female team-sport athletes.

Aims

The aims of this systematic review are to (i) investigate the effect of lower body strength training on short sprint performance (0-10 m and 0-20 m) in female team-sport athletes, and (ii) determine the most effective strength training modality (i.e., reactive-; maximal-; combined-; special-strength) that improves sprint performance.

Methods

An electronic database search was performed using PubMed, MEDLINE, SPORTDiscus, CINAHL, The Cochrane Library, and SCOPUS to identify relevant articles. Search phrases were determined through pilot screening of previously known literature to identify terms relevant to the population, the training intervention, and the performance outcome. A random-effects meta-analysis was performed to establish standardised mean difference with 95% confidence intervals and the magnitude and direction of the effect.

Search Terms	Keywords
1. Population	"female team sports" OR "female invasion sports" OR "female athletes" OR "women's team sports" OR "women's invasion sports" OR "women athletes"
2. Intervention	"strength" OR "reactive-strength" OR "explosive strength" OR "special strength" OR "resistance training" OR "power training" OR "plyometric" OR "weightlifting" OR "resisted sprinting" OR "sled sprinting" OR "circuit training" OR "jump training"
3. Outcome	"sprint*" OR "sprint performance" OR "acceleration" OR "velocity" OR "speed performance"
Search Phrase	1 AND 2 AND 3

Results

1. 0-10 m sprint performance

11 experimental groups were analysed from 8 original studies examining the effect of strength training on sprint performance. Compared to the control, the overall summary effect demonstrated a small improvement in sprint performance in favour of the experimental group, however this effect was not statistically significant [SMD = -0.36, 95% CI (-0.80, 0.09), Z = 1.57, p = 0.12]. Forest plot for 0-10 m sprint performance is presented in Figure 1.

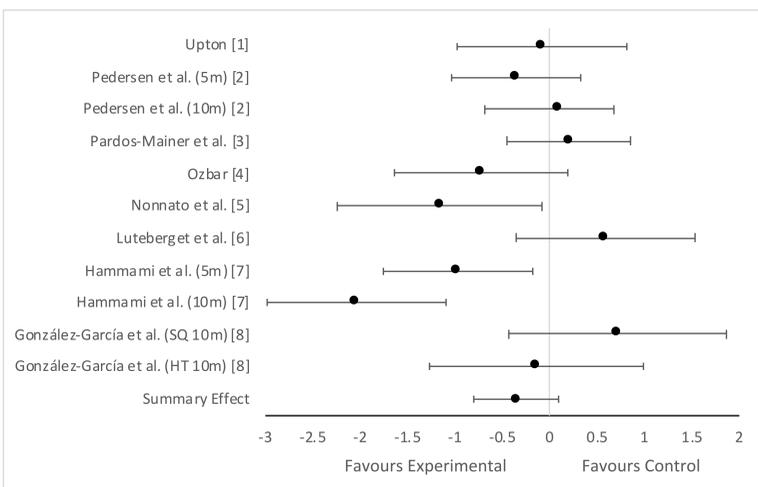


Figure 1: Forest plot presenting the standardised mean difference (SMD) and 95% confidence intervals for sprint performance over 0-10 m.

Results

2. 0-20 m sprint performance

14 experimental groups were analysed from 12 original studies examining the effect of strength training on sprint performance. When compared to the control, the overall summary effects demonstrated a moderate and significant improvement in sprint performance in favour of the experimental group [SMD = -0.69, 95% CI (-1.06, -0.33), Z = 3.74, p = 0.0002]. Forest plot for 0-20 m sprint performance is presented in Figure 2.

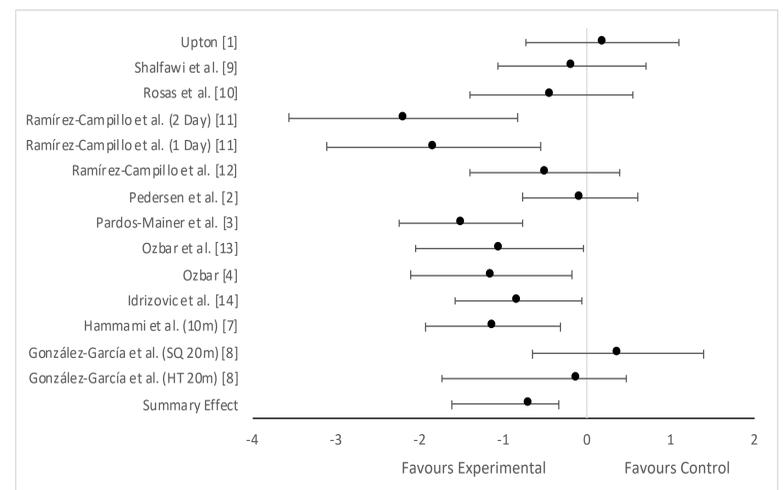


Figure 2: Forest plot presenting the standardised mean difference (SMD) and 95% confidence intervals for sprint performance over 0-20 m.

Conclusion

This meta-analysis demonstrates that strength training has a small to moderate effect on sprint performance in female team-sport athletes.

- Strength training resulted in a small improvement in initial acceleration (i.e., 0-10 m) and a moderate improvement for late-stage acceleration (i.e., 0-20 m).
- The magnitude of improvement in sprint performance was influenced by the strength quality (i.e., reactive-, maximal-, combined-, and special-strength) utilised in the intervention.
- Compared to maximal- or special-strength interventions, reactive- and combined-strength training methods can have a greater effect on sprint performance.

Female athletes are likely to respond differently to a training intervention compared to male athletes. Therefore, the information presented in this meta-analysis has important implications for practitioners who aim to improve sprint performance specifically for female team-sport athletes.

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