SACAD: John Heinrichs Scholarly and Creative Activity Days

Volume 2022 Article 51

4-20-2022

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Recommended Citation
Dunn, Matthew (2022) "Effectiveness of Small-Sided Games in Improving Repeated Sprint Ability In Soccer: a systematic review," *SACAD: John Heinrichs Scholarly and Creative Activity Days*: Vol. 2022, Article 51.
DOI: 10.58809/EEPQ4572
Available at: https://scholars.fhsu.edu/sacad/vol2022/iss2022/51

Effectiveness of Small-Sided Games in Improving Repeated Sprint Ability In Soccer: a systematic review

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Abstract

Introduction: Small-sided games (SSGs) for soccer typically use 2-5 players per team on a smaller field. Soccer coaches employ SSGs to simulate specific aspects of full-sized soccer and optimize practice time by working on multiple match components at once. This review was conducted to see if SSGs also improved the physical ability of soccer players, specifically a player's repeated sprint ability (RSA).
Methods: Research databases were searched using specific keywords. Articles were filtered to identify suitable articles for the review. The 4 articles identified were evaluated on participant characteristics, program prescription, load dosage, playing area dimensions, and RSA scores
Results: Eighty articles were identified during the initial search, but only 4 met all inclusion criteria. The overall conclusion from this limited sample of articles was that SSGs improved RSA scores in specific categories.
Conclusions: SSGs can be recommended to professionals as a potential method for improving physical performance capacity of soccer players. Additional high quality studies are needed to better clarify the impact of specific SSG rules and field dimensions for optimizing RSA improvement.

Introduction

Being able to repeat explosive movement patterns continuously with the same level of intensity is what is known as repeated sprint ability (RSA; Spencer et al, 2005). RSA is a measure of success for athletes in sports that require maximum or near-maximum intensity sprints with brief rest periods over 60-90 minutes (Bishop et al, 2001). RSA is characterized using four components: best time, total time, average time, and fatigue index. Best time is the shortest recorded time for the specified sprint carried out. Total time is the sum of all the recorded sprint times. Fatigue index summarizes the entire series of sprints to identify percent decrease in performance. The average time is the mean for all the sprints executed by the athlete.
Small-sided games (SSGs) for soccer are a training tool used to manipulate certain variables of the game and achieve desired outcomes or practice objectives. Among the variables that can be manipulated are the dimensions and area of the field, the number of players, the rules of the game, tactical behaviors, and work-to-rest ratio (Sanchez-Sanchez et al, 2018). While SSGs are an important tool for coaches, they also represent an engaging and fun method of practicing for players, especially when the goal of the session is physical development (Hill-Haas et al, 2011). This review specifically evaluated evidence from previous studies on how SSGs impact RSA.

Methods

This review utilized guidelines suggested by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA; Shamseer et al, 2015). The search strategy was carried out between September and October 2021 using the PubMed, CINAHL, and MedLine electronic databases. The following keywords were included using a Boolean combination: small-sided games and repeated sprint ability. Inclusion criteria included: sport of soccer, age of participants ≥12 years old, amateur or elite soccer players, RSA pre and post-test comparison, intervention ≥3 weeks, experimental or quasi-experimental design, articles published in English, and articles published no more than 10 years ago. The remaining reports were further screened using the following exclusion criteria: duplicates, missing or incomplete results, and abstracts only. The data extracted from each article included: participant characteristics (age, sex, soccer ability level), program prescription (number of weeks, days per week), load dosage (working time per session, working time per week, total time of intervention), dimensions of playing area (field width, field length, ration of m^2 per player), and RSA score (best time, average time, total time, fatigue index).

Results

After identifying 80 total articles from the search and removing 36 duplicates, 44 articles were screened. From the 44 articles, 4 studies met the criteria for inclusion. Fifteen studies did not include an RSA pre and post-test score, 8 studies were not related to soccer, 4 studies were outside the date range, and 13 studies only included the abstract or couldn't not be accessed. The precision of the search, excluding duplicate articles was 9.1%. The total number of participants from the articles used was 77 male soccer players with a mean age of 18.4 years old (age ranged from 14 to 33 years old). Twenty-three played amateur soccer with 39 playing youth academy level and 15 playing elite level soccer. Fifty-six participants were exposed to a small-sided games intervention with 10 being subjected to traditional physical fitness and 11 performed a HIIT intervention.

Study	Sample Ability	Sample Number	SSG Characteristics	RSA Testing Protocol	RSA Outcome
Owen et al. (2012)	Elite Level Senior	15	3 vs. 3 with goalkeeper Workload: 8 x 3min/2 min recovery	6x20m maximal sprints w/25sec rest in between sprints	11% faster RSA average fastest time over 10m (1.77s to 1.75s) and 7% increase over 20m (3.08s to 3.06s)
Bujalance-Moreno et al. (2018)	Semi-pro or amateur adult	23	2 vs. 2 & 4 vs. 4 Workload: 5 x 5 mins /5 min recovery	6x40m (20m+20m) w/ 20secs passive recovery	3.35% increase in RSA average score for SSG vs. traditional physical training
Arslan et al. (2020)	Elite level junior	20	Various 2 vs. 2 situations Workload: 2 x 2.5 min/2 min recovery up to 2 x 4.5 mins/2 min recovery	6 reps of 2x15m sprints (~6secs between each) w/ 20 seconds passive recovery	5.9% faster over 10m (2.15s to 2.03s), 7.9% faster over 20m (3.79s to 3.51s), 7.1% faster over 30m (5.15s to 4.81s), and 6.2% faster total time (37.8s to 35.6s)
Eniseler et al. (2017)	Elite level junior	19	3 vs. 3 no goalkeeper Workload: 4 x 3 min/4 min recovery	6 reps of 2x20m maximal sprints w/ 20secs passive recovery	55% decrease in decremental % (5.8 to 3.75), 2% increase in mean total time (7.12s to 7.22s), 3% increase in best RSA time (6.73s to 6.96s)

Results/Discussion

The evidence from these 4 studies suggests SSGs can improve RSA in soccer players. Owen et al. (2012) and Arslan et al. (2020) both found improvements in best sprint times over 10m, 20m, and 30m. Best times are typically observed early in a series of sprints. RSA should primarily evaluate the ability to perform such sprints repeatedly over an extended period. Eniseler et al. (2017) reported that RSA decrement improved with SSGs meaning the drop-off from the best to worst sprint decreased. Bujalance-Moreno et al. (2018) also support the improvement of average RSA following SSG training.
The selected studies utilized different SSG manipulations and rules making it more difficult to generalize from their results. The work-to-rest ratio was altered for each study, and some used the same program throughout the duration of the study whereas others altered the work-to-rest ratio as weeks progressed. Since only 4 studies were identified, it is possible that the outcomes are specific to unique interactions between characteristics of participants and SSGs in each study. It is also still possible that different SSGs can all contribute to improving aspects of RSA performance in soccer athletes.
The studies identified for this review identified improvement in at least one aspect of RSA. We must remember that SSGs are typically implemented by coaches to emphasize specific skills, match strategies and physical demands. It is not reasonable to recommend complete standardization of SSGs. However, understanding the impact of SSGs on conditioning and RSA would be greatly improved by larger well designed studies using randomized crossover or similar designs with specific SSG manipulations. Another option may be consolidation of data from large numbers of athletes in many programs wearing performance tracking devices during various SSGs.

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