INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Effects of small-sided games interventions on technical execution and tactical behavior of youth team sports players: A systematic review and meta-analysis

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Review question / Objective: **This systematic review with meta-analysis was conducted to assess the effects of SSGs programmes on technical execution and tactical behavior of youth team sports players.**
Condition being studied: **SSGs-based programmes restricted to a minimum of 3 weeks (duration) and no restricted to weekly frequency in youth team sports players from any sex or skill.**
Information sources: **Electronic databases (Cochrane, Embase, Medline (PubMed), Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 January 2021 and was last updated on 28 January 2021 (registration number INPLASY202110108).

INTRODUCTION

Review question / Objective: **This systematic review with meta-analysis was conducted to assess the effects of SSGs programmes on technical execution and tactical behavior of youth team sports players.**

Rationale: **Small-sided games (SSGs) are adjusted format of the official game format that is often used in training scenarios for introducing a given tactical issue to the**

team sports players. Besides the acute effects of SSGs on the player's performance, it is expectable that the consistent use of these drill-based games may conduct to adaptations in technical execution and tactical behavior of the players, mainly in youth categories.

Condition being studied: SSGs-based programmes restricted to a minimum of 3 weeks (duration) and no restricted to weekly frequency in youth team sports players from any sex or skill.

METHODS

Search strategy: Electronic databases (Cochrane, Embase, Medline (PubMed), Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications. Keywords and synonyms were entered in various combinations in all fields: (youth OR young OR "child*" OR "adolescent") AND ("team sport" OR football OR soccer OR futsal OR handball OR volleyball OR basketball OR hockey OR rugby OR cricket OR "water polo" OR lacrosse OR softball OR korfball OR baseball) AND ("small-sided games" OR "sided-games" OR "drill-based games" OR "SSG" OR "conditioned games" OR "small-sided and conditioned games") AND ("technical" OR "tactic*" OR "skill" OR "ability" OR "behavior" OR "decision making"). An external expert was contacted to verify the final list of references included in this systematic review and to indicate if there was any study that was not detected through our search.

Participant or population: Youth team sports players (i.e., < 18 years old) from any sex or skill, without injury, illness or other clinical condition.

Intervention: SSGs-based programmes restricted to a minimum of 3 weeks (duration) and no restricted to weekly frequency.

Comparator: Passive or active control groups.

Study designs to be included: Controlled-trials.

Eligibility criteria: Inclusion criteria: (i) Youth team sports players (< 18 years old) from sex or skill, without injury, illness or other clinical condition. Team sports included, among others: soccer (association football), futsal, handball, volleyball, basketball, hockey, rugby, Australian football, America football, water polo, lacrosse, softball, baseball, korfball; (ii) SSGs-based programmes restricted to a minimum of 3 weeks (duration) and no restricted to frequency (number of sessions per week). SSGs combined with other training methods will be also included, if any; (iii) Passive or active control groups; (iv) Pre-post intervention values of technical execution (i.e., measures that assess individual ability skill or accuracy of technical execution related with the sport) and/or tactical behavior (i.e., measures that assess individual ability to organize the behavior based on the tactical principles and collective dynamics of the game); (v) Controlled and/or parallel trials, with no significant differences between groups in baseline assessment of the main outcome; (vi) Peer reviewed, original, full-text studies written in English, Portuguese and/or Spanish. Exclusion criteria: (i) Team sports players with more than 18 years old. Team sports players in rehabilitation or in return-to-play programmes. Other sports than team sports with ball; (ii) Interventions with less than 3 weeks. Other training methods not related to SSGs (e.g., analytical exercises, running exercises); (iii) Other SSGs training groups; (iv) Outcomes not related to technical execution or tactical behavior; no information (e.g., mean; standard deviation) reported for pre- and/or post-intervention (e.g., follow-up excluded); (v) Non-controlled studies or controlled trials in which baseline levels of the groups were significant for the main outcome; (vi) Written in other language than English, Portuguese and/or Spanish. Reviews, letters to editors, trial registrations, proposals for protocols, editorials, book chapters, conference abstracts.

Information sources: Electronic databases (Cochrane, Embase, Medline (PubMed), Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications.

Main outcome(s): Aiming to establish consistency in data analyzing and reporting, only measures that were analyzed three or more times for different articles were included. For technical execution were considered the pre-post intervention outcomes that analyzed the skill level of the player in the specific sport, or the accuracy of skill. For tactical behavior, were considered the pre-post intervention outcomes that assessed individual ability to organize the behavior based on the tactical principles and collective dynamics of the game. The method used for the assessment of balance was also extracted.

Additional outcome(s): Adverse effects were also extracted as secondary outcome, in case of any reported.

Quality assessment / Risk of bias analysis: The version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB2) (J. A. C. Sterne et al., 2019) was used to assess the risk of bias in the included randomized-controlled trials. Five dimensions are inspected in this assessment tool: (i) bias arising from the randomization process; (ii) bias due to deviations from intended interventions; (iii) bias due to missing outcome data; (iv) bias in measurement of the outcome; and (v) bias in selection of the reported result. Using RoB2 a qualitative synthesis was performed. Two of the authors (JA and HS) independently assessed the risk of bias. Any disagreement in the rating was resolved through discussion and by a third author (FMC). The Cochrane risk of bias in non-randomized studies of interventions (ROBINS-I) was used to assess the risk of bias in included non-randomized intervention studies (J. A. Sterne et al., 2016). Three domains are analyzed in this assessment tool: (i) pre-intervention (bias due to confounding; bias in selection of participants into the study); (ii) at intervention (bias in classification of interventions); and (iii) post-intervention (bias due to deviations from intended interventions; bias due to missing data; bias in measurement of outcomes; bias in selection of the reported results).

Strategy of data synthesis: We followed previously stablished methods. Briefly, analysis and interpretation of results were only conducted in the case of at least three studies provided baseline and follow-up data for the same measure. Pre-training and post-training means and standard deviations (SD) for dependent variables were used to calculate effect sizes (ES; Hedge's g) for each outcome measure in the SSGs and control groups. Data were standardized using post-intervention SD values. The random-effects model was used to account for differences between studies that might impact the PJT-based effect. The ES values are presented with 95% confidence intervals (CI). Calculated ES were interpreted using the following scale: 0.6–1.2, moderate; >1.2–2.0, large; >2.0–4.0, very large; >4.0, extremely large. Heterogeneity was assessed using the I2 statistic, with values of 75% considered to represent low, moderate, and high levels of heterogeneity, respectively. The risk of bias was explored using the extended Egger's test. When bias was present, the trim and fill method was applied, in which case L0 was assumed as the default estimator for missing studies. All analyses were carried out using the Comprehensive Meta-Analysis software (version 2; Biostat, Englewood, NJ, USA). Statistical significance was set at $p \leq 0.05$.

Subgroup analysis: Moderated analyses were planned to use a random-effects model and independently calculated single factor analysis. When possible, the median split technique was planned. Moderator analysis was considered for the sex of participants, length and weekly frequency of the interventions.

Sensitivity analysis: When bias was present, the trim and fill method was applied, in which case L0 was assumed as the default estimator for missing studies.

All analyses were carried out using the Comprehensive Meta-Analysis software (version 2; Biostat, Englewood, NJ, USA). Statistical significance was set at p ≤0.05.

Language: English.

Country(ies) involved: Portugal; Chile; Brazil; Switzerland.

Keywords: football; performance; children; decision-making; motor learning.

Contributions of each author:
Author 1 - Filipe Manuel Clemente - FMC lead the project, wrote and revised the original manuscript.
Author 2 - Rodrigo Ramirez-Campillo - RRC analyzed and interpreted the data, wrote the statistical report and revised the original manuscript.
Author 3 - Hugo Sarmento - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.
Author 4 - Gibson Moreira Praça - Wrote and revised the original manuscript.
Author 5 - José Afonso - Wrote and revised the original manuscript.
Author 6 - Ana Filipa Silva - Wrote and revised the original manuscript.
Author 7 - Thomas Rosemann - Wrote and revised the original manuscript.
Author 8 - Beat Knechtle - Wrote and revised the original manuscript.