INPLASY PROTOCOL

To cite: Clemente et al. Effects of pitch size on the physiological, physical, technical and tactical responses during small-sided soccer games: A meta-analytical comparison. Inplasy protocol 202140016. doi: 10.37766/inplasy2021.4.0016

Received: 03 April 2021

Published: 03 April 2021

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Support: **None.**

Review Stage at time of this submission: **Data analysis.**

Conflicts of interest:
None declared.

Effects of pitch size on the physiological, physical, technical and tactical responses during small-sided soccer games: A meta-analytical comparison

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Review question / Objective: **This systematic review with meta-analysis was conducted to compare the effects of smaller vs. larger pith sizes on physiological, physical, technical and tactical responses during soccer SSGs.**
Condition being studied: **Soccer players participating in SSGs in smaller and larger pitch sizes.**
Information sources: **Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the February 18, 2021. Keywords and synonyms were entered in various combinations in all fields: ("soccer" OR "football") AND ("small-sided games" OR "conditioned games" OR "SSG" OR "drill-based games" OR "small-sided conditioned games") AND ("pitch" OR "field"). Additionally, the reference lists of the included studies retrieved were manually searched to identify potentially eligible studies not captured by the electronic searches. Finally, an external expert in small-sided games with more than 10 publications in the last five years 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 research.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 April 2021 and was last updated on 03 April 2021 (registration number INPLASY202140016).

INTRODUCTION

Review question / Objective: **This systematic review with meta-analysis was conducted to compare the effects of smaller vs. larger pith sizes on physiological, physical, technical and tactical responses during soccer SSGs.**

Rationale: **Small-sided games (SSGs) are popular drill-based exercises often used in soccer for promoting a specific tactical**

issue while keeping a stimulus in the multiple dimensions of performance. One of the most used task constraints in the designing process of SSGs is the manipulation of pitch size, thus promoting increases or decreases in the relative area per player. Such adjustment conducts to changes in acute responses of soccer players during the exercises.

Condition being studied: Soccer players participating in SSGs in smaller and larger pitch sizes.

METHODS

Search strategy: Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the February 18, 2021. Keywords and synonyms were entered in various combinations in all fields: ("soccer" OR "football") AND ("small-sided games" OR "conditioned games" OR "SSG" OR "drill-based games" OR "small-sided conditioned games") AND ("pitch" OR "field"). Additionally, the reference lists of the included studies retrieved were manually searched to identify potentially eligible studies not captured by the electronic searches. Finally, an external expert in small-sided games with more than 10 publications in the last five years 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 research.

Participant or population: Soccer players from any age-group, sex or skill, without injury, illness or other clinical condition.

Intervention: Smaller pitch sizes using any format of play (number of players involved) or other task condition.

Comparator: Larger pitch sizes using any format of play (number of players involved) or other task condition (since keeping the same experimental conditions of smaller formats).

Study designs to be included: Counter-balanced cross-over design.

Eligibility criteria: Inclusion criteria: (i) Soccer players from any age-group, sex or skill, without injury, illness or other clinical condition; (ii) Smaller pitch sizes using any format of play (number of players involved) or other task condition. The following conditions were ensured: The same pitch size was repeated at least two times (two repetitions) for the same players; The smaller pith size was extracted from the lowest relative pitch area (i.e., in case of studies comparing ≥three pitch sizes for the same format or condition, only the smallest pitch size was extracted); The same experimental conditions between smaller and larger pitch sizes were ensured (i.e., same teams, same players, same time duration, same task constraints); (iii) Larger pitch sizes using any format of play (number of players involved) or other task condition. The following conditions were ensured:- The same pitch size was repeated at least two times (two repetitions) for the same players;- The larger pith size was extracted from the greatest relative pitch area (i.e., in case of studies comparing ≥three pitch sizes for the same format or condition, only the largest pitch size was extracted);- The same experimental conditions between smaller and larger pitch sizes were ensured (i.e., same teams, same players, same time duration, same task constraints); (iv) At least one measure of the following possibilities:- Physiological responses (e.g., heart rate, blood lactate concentrations or rated of perceived exertion);- Physical demands (e.g., total distance, distances covered at different speed thresholds, acceleration/decelerations);- Technical execution (e.g., passes, receptions, shots);- Tactical behavior (e.g., attacking or defensive tactical principles, collective organization measures); (v) A counterbalanced cross-over design; (vi) Peer reviewed, original, full-text studies written in English, Portuguese and/or Spanish. Exclusion criteria: (i) Other sports than soccer (e.g., futsal or football indoor, beach soccer, American football, Australian football, basketball, handball, volleyball,

hockey); (ii) - The same pitch size was applied in only one repetition;- Smaller and larger pitch sizes conditions were not applied with same contextual and experimental conditions; (iii) - The same pitch size was applied in only one repetition; - Smaller and larger pitch sizes conditions were not applied with same contextual and experimental conditions; (iv) Other outcomes than those related to immediate physiological and physical, technical or tactical responses (e.g., fatigue tests, well-being tests); (v) Non-counterbalanced cross-over design studies; (vi) Written in other language than those selected (English, Portuguese and/or Spanish). Reviews, letters to editors, trial registrations, proposals for protocols, editorials, book chapters, conference abstracts.

Information sources: Electronic databases (PubMed, PsycINFO, Scielo, Scopus, SPORTDiscus and Web of Science) were searched for relevant publications prior to the February 18, 2021. Keywords and synonyms were entered in various combinations in all fields: ("soccer" OR "football") AND ("small-sided games" OR "conditioned games" OR "SSG" OR "drill-based games" OR "small-sided conditioned games") AND ("pitch" OR "field"). Additionally, the reference lists of the included studies retrieved were manually searched to identify potentially eligible studies not captured by the electronic searches. Finally, an external expert in small-sided games with more than 10 publications in the last five years 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 research.

Main outcome(s): At least one measure of the following possibilities: - Physiological responses (e.g., heart rate, blood lactate concentrations or rated of perceived exertion); - Physical demands (e.g., total distance, distances covered at different speed thresholds, acceleration/decelerations); - Technical execution (e.g., passes, receptions, shots); - Tactical behavior (e.g., attacking or defensive tactical principles, collective organization measures).

Quality assessment / Risk of bias analysis: The methodological index for non-randomized studies (MINORS) was used for assessing the methodological quality of the included studies (Slim et al., 2003). This scale classifies twelve items of the original articles, in which a score of zero indicates the absence of a report, the score of one represents that report is inadequate and two points indicate that the report is adequate.

Strategy of data synthesis: Aiming to establish consistency in data analyzing and reporting, only measures that were analyzed three or more times for different articles were included. For physiological responses the following list of measures were extracted, and following this order of priority: (i) heart rate responses (e.g., absolute or relative); (ii) blood lactate concentrations; and (iii) RPE. For physical demands, the following list of measures were extracted and following this order of priority: (i) total distance covered; (ii) distance covered at different speed thresholds; (iii) accelerations and decelerations (number at different intensity thresholds); and (iv) mechanical workload measures (derived from inertial measurement unit). For technical execution the following list of measures were extracted and following this order of priority: (i) individual passes (total number, relative number considering accuracy); (ii) individual receptions (total number, relative number considering accuracy); (iii) individual shots (total number, relative number considering accuracy); and (iv) individual dribbles (total number, relative number considering accuracy). For tactical behavior the following list of measures were extracted and following this order of priority: (i) individual attacking tactical behavior; (ii) individual defensive tactical behavior; (iii) collective measure of dispersion. Tests and instruments used for measuring the outcomes were also extracted. Mean and standard deviation for each outcome extracted in smaller and

larger pitch sizes were collected. Additionally, the following information was extracted from the included studies: (i) number of participants (n), age (years), competitive level (if available) and sex; (ii) the SSGs format (e.g., 5 vs 5; 6 vs 6), pitch size and relative area per player; (iii) regimen of intervention (work duration, work intensity, modality, relief duration, relief intensity, repetitions and series, between-set recovery).

Subgroup analysis: Sub-group analysis considered the following the groups of formats of play: (a) duels (1vs.1); (b) small formats (2vs.2, 3vs.3 and 4vs.4); (c) medium formats (5vs.5, 6vs.6, 7vs.7, 8vs.8); and (d) large formats (9vs.9, 10vs.10, 11vs.11). Additionally, information about age-group was also considered as moderator (young & youth < 18 years old; adults > 18 years old).

Sensitivity analysis: Heterogeneity was assessed using the I2 statistic, with values of 75% considered to represent low, moderate, and high levels of heterogeneity, respectively (Higgins and Thompson, 2002). The risk of bias was explored using the extended Egger's test (Egger et al., 1997). To adjust for publication bias, a sensitivity analysis was conducted using the trim and fill method (Duval and Tweedie, 2000), with L0 as the default estimator for the number of missing studies (Shi and Lin, 2019).

Language: English.

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

Keywords: football; soccer; athletic performance; motor learning; motor skills.

Contributions of each author:

Author 1 - Filipe Manue Clemente - Lead the project, wrote and revised the original manuscript.
Author 2 - Gibson Praça - Wrote and revised the original manuscript.
Author 3 - Rodrigo Aquino - Wrote and revised the original manuscript.
Author 4 - Daniel Castillo - Wrote and revised the original manuscript.
Author 5 - Javier Raya-González - Wrote and revised the original manuscript.
Author 6 - Markel Rico-González - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.
Author 7 - José Afonso - Wrote and revised the original manuscript.
Author 8 - Hugo Sarmento - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.
Author 9 - Ana Filipa Silva - Wrote and revised the original manuscript.
Author 10 - Rodrigo Ramirez-Campillo - Analyzed and interpreted the data, wrote the statistical report and revised the original manuscript.