

# Small – sided games: a reflection – what the research says

## Summary

This opinion article is based on a critique of small-sided games used in soccer as a means of aerobic physical improvement for players. An opinion report based on verified experience with soccer players in our FIFA Center of Excellence.

**Keywords:** soccer, aerobic power, small games

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## Introduction

Small-sided games (SSGs) are often employed by current weekday soccer coaches based on the premise that the greatest benefits of this type of training occur when exercise simulates the specific movement patterns and the physiological demands of the sport would occur within them.<sup>1,2</sup> However, this hypothesis was tested and it was found that SSGs alone cannot be used as a valid and reliable indicator of physical fitness to improve aerobic capacity in high-performance soccer.<sup>3-6</sup> From a technical and tactical point of view, it can be a relative truth. However, the challenging question is: to what extent is the efficiency of SSGs translated into a larger pitch with longer displacements than those performed in the reduced pitch? From a physical and athletic point of view, this is not what research on SSGs shows.<sup>4,5,7</sup> Soccer coaches can use SSGs for the purposes of technical and tactical preparation for the game, but not as an absolute means for the physical training of athletes.<sup>4,5</sup> These findings demonstrate that training on reduced pitches simulates to some extent the general movement patterns of soccer competition, but offers an insufficient training stimulus and is not adequate to simulate and maintain the physical demands of repeated sprints and high-intensity displacements of the pitch. Competition is practiced on a much larger pitch than on the reduced field using longer distances.<sup>7</sup>

## Methods

This opinion piece was constructed on the experience of our physiology laboratory within the FIFA Medical Excellence Center in Brazil and analyzing the published literature on these SSGs. The perception of the panorama of an aerobic physiological variable essential for soccer such as VO<sub>2</sub>max can only be measured by observational work with cohort studies. Over 4 years we evaluated 113 professional players in our Laboratory who trained an average of 10 hours/week, one or two matches a week, with an average age of 23.4 (18-34y); weight: 74.5 (58-97kg); height: 178.9 (162-198cm) and, and body fat: 17.1 (11-21.2%). All performed cardiopulmonary exercise testing. A questionnaire applied to the players, without the presence of the physical trainer, showed that aerobic metabolism was not valued (Table 1). The participation of the trainer would not isolate

the athlete, and it could intimidate him, causing a bias in the response. The participation of trainers was only in describing the training modalities for the construction of the questionnaire.

## Results and discussion

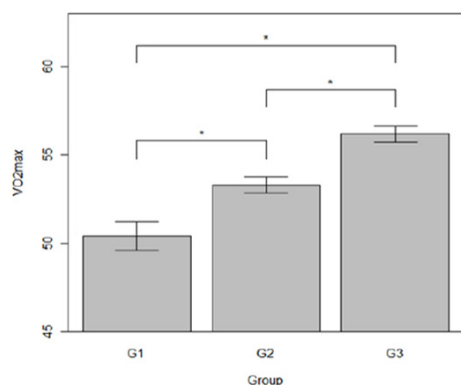
Soccer is a dynamic and imponderable game. Therefore, it is not prudent to completely replace running-based methods, already established by extensive literature to perform only SSGs as a form of athletic training.<sup>8</sup> Unfortunately, despite the similarities between SSGs and sprint-based interval training (HIIT) in improving aerobic performance, the effects are not the same for powerful actions like sprinting, vertical jumping, or maintaining intensity. Furthermore, it concluded that 3 SSGs led to less acute stimulation of aerobic metabolism, suggesting a lower potential for chronic aerobic adaptations.<sup>9</sup> Based on this aspect, the results suggest that programs based on SSGs should be complemented by other training methods that benefit training capacities and develop metabolic protection for the long duration of decisive matches in soccer players.<sup>5,10</sup> SSGs are not suitable for simulating and maintaining the physical demands of repeated sprints, repeated displacements at high intensity of competition, pressure marking, rapid recomposition of practiced attack/defense, constant acceleration/deceleration in a pitch much larger than the reduced pitch and that requires an optimal aerobic level (stamina).<sup>7,8</sup>

Therefore, this would require a very large muscle buffering capacity to the H<sup>+</sup> ions that are increased during intense exercise in the presence of decompensated metabolic acidosis accelerating fatigue in the athlete. A study published by our center (Table 1) showed excessive training with SSGs to the detriment of other more consistent modalities to increase athletes' cardiorespiratory capacity (Figure 1).<sup>6</sup> In our cohort study, of the 113 professional soccer players evaluated, only 2 athletes (2%) attained VO<sub>2</sub>max above 60 mL/min/kg.<sup>6</sup> Team sports athletes require a high level of aerobic conditioning to generate and maintain power during repeated high-intensity efforts (speed and speed resistance) and to recover after intense stimuli during the match. It is not the SSGs that will contemplate the soccer player (male and female) with these adaptations.

**Table 1** Questionnaire on the relative percentage of the perception of professional soccer players on their physical qualities trained during training sessions by physical trainers (season and pre-season). A four season cohort study

Physical qualities	Yes (%)	Not (%)	Sometimes (%)
(QA) Agility exercises	100	0	0
(QB) Velocity (Sprint training)	100	0	0
(QC) Small-sided games [reduced pitch] (3 x 3; 4 x 4; 5 x 5; 6 x 6)	90	5	5
(QD) Core and functional exercises	80	15	15
(QE) Resistance exercises (weight training)	70	20	10
(QF) Balance exercises	30	65	5
(QG) Flexibility exercises	40	40	20
(QH) Circuit-training	60	30	10
(QI) Cardiorespiratory endurance (continuous training, long interval-training, 3 or 4 min)	5	95	0

**Note:** The dispersion found regarding the variables operated by the trainers during the training sessions by the players is very diverse. N= number of players who answered the questions (Q=question)



**Figure 1** Mean (±SD) of maximal oxygen uptake (VO<sub>2</sub>max, mL.min<sup>-1</sup>.kg<sup>-1</sup>) of nonprofessional's (amateur) adult's soccer players (G1), professional's adult's soccer players (G2) and professional's junior's soccer players (G3). (\*) indicate significant difference.

## Conclusions

While there are similarities between SSGs and real games on large pitches, several factors set them apart.<sup>10</sup> Determinant external load

results (high-speed running, sprints, or accelerations) reveal that SSGs underexpose soccer players to the typical demands of a real game that do not represent the needs of a long-term game.<sup>11</sup> The impression we have is that there seems to be confusion about the aerobic physiology of soccer and the athletes are being harmed.

## Acknowledgments

None

## Conflicts of interest

The author declares that there are no conflicts of interest.

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