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The Mindfulness- Based Soccer Program (MBSoccerP): Effects on Elite Athletes

El Programa Basado en Mindfulness nel Fútbol (MBSoccerP): Efectos en los Atletas de Élite

Programa baseado no Mindfulness para Futebol Profissional (MBSoccerP): estudo de eficácia em Atletas de Elite

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ABSTRACT

Newly, 3º wave Cognitive Behavioral Therapy (CBT) programs suggest that mindfulness-based programs might be a powerful strategy to optimize performance and improve flow.
The aim of this study was to examine the effectiveness of a Mindfulness-Based Soccer Program (MBSoccerP) on elite soccer athletes. In a quasi-experimental design with experimental (n = 28) and control group (n = 29), the effectiveness of MBSoccerP was tested. The results of an analysis of covariance with repeated measures indicate that the intervention group (M=25.68, SD=3.42) significantly improved in Mindfulness-act with awareness; Mindfulness non-react; Self-compassion mindfulness; Self-compassion self-kindness; Self-compassion common-humanity subscales; Dispositional flow state total scale; and decreased Brief Symptom Inventory anxiety subscale and experiential avoidance, as traits compared to the control group, and increase direct measures scores of sports performance Athlete´s Performance Self-Rating Scale and Coach´s Performance Self-Rating Scale. Results suggest that MBSoccerP can be effective in enhance elite soccer performance, self-compassion, psychological flexibility, mindfulness and flow.
Keywords: *MBSoccerP, Elite Soccer Athletes, Mindfulness, Sport Performance*

RESUMEN

Recientemente, los programas de Terapia cognitiva conductual (TCC) de 3ª generación sugieren que los programas basados en el *mindfulness* pueden ser una estrategia poderosa para optimizar el rendimiento y mejorar el estado de *flow*. El objetivo de este estudio fue examinar la eficacia de un programa de *mindfulness* (MBSoccerP) en atletas de fútbol profesional. En un plano cuasi-experimental con grupo experimental (n = 28) y grupo de control (n = 29), se probó la eficacia del MBSoccerP. Los resultados del

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análisis de covariancia con medidas repetidas indicaron que el grupo experimental (*M* = 25.68, *SD* = 3.42) mejoró significativamente el *Mindfulness* agir consciente, *Mindfulness* Agir Consciente y *Mindfulness* No Reaccionar subescalas, la Autocompasión *Mindfulness*, Autocompasión Auto-bondad, y la Autocompasión Humanidad Común subescalas, el estado de *flow* total escala, y desempeño deportivo total y entrenador total indicador. Se verificó la disminución de Breve inventario de sintomas Ansiedad subescala y evitación experiencial escala, en comparación con el grupo de control. Los resultados sugieren que MBSoccerP puede ser efectivo en la optimización del rendimiento, *mindfulness*, auto-compasión, flexibilidad psicológica y estado de *flow*.
Palabras clave: MBSoccerP, Atletas de Elite, Mindfulness, Sport Performance

RESUMO

Recentemente, a Terapia Cognitivo-Comportamental (TCC) de 3º geração sugere que os programas baseados no *mindfulness* podem ser uma estratégia útil e eficaz na otimização do desempenho e melhoria do estado de *flow*. O objetivo deste estudo foi examinar a eficácia de um programa de *mindfulness* em atletas de futebol profissional - 2ª liga (MBSoccerP). Num plano quase-experimental com grupo experimental (*n* = 28) e grupo de controle (n = 29), foi testado o impacto do programa MBSoccerP. Os resultados da análise da covariância (medidas repetidas), indicaram que o grupo experimental (*M* = 25.68, *SD* = 3.42) melhorou significativamente nas subescalas *Mindfulness* Agir Consciente, *Mindfulness* Não Reagir; nas subescalas Auto-compaixão Mindfulness, Autobondade e Condição Humana; na escala de *Flow* Disposicional, e desempenho desportivo global dos atletas pela Ficha de Avaliação de Indicadores da Performance-Versão Atleta/Treinador. Verificou-se ainda a diminuição na subescala Ansiedade do Inventário de Sintomas Breve e no evitamento experiencial, por comparação com o grupo de controlo. Os resultados sugerem que o MBSoccerP pode ser efetivo na otimização do desempenho, *mindfulness*, auto-compaixão, flexibilidade psicológica e estado de *flow*.

Palavras-chave: MBSoccerP, Atletas de Elite, *Mindfulness*, Desempenho Desportivo

INTRODUCTION

The efficacy of the traditional Model of Psychological Skills Training (PST) model has recently been challenged due to its emphasis on control and reduction of internal processes (Gardner & Moore, 2007; Moore, 2009). Novel approaches to optimal performance training, based on mindfulness, compassion and acceptance of internal processes, have been developed and introduced in elite sport context (Gardner & Moore, 2007; Kabat-Zinn, Lipworth & Bureney 1985; 2003; Kaufman, Glass & Arnkoff, 2009; Mosewich, Crocker, Kowalski & Delongis, 2013).

Orsillo and Roemer (2011) indicated that self-compassion starts with assumption that all humans are valuable and worthy regardless of their physical characteristic or achievement. Crocker and Canevello (2008) explain that Self-compassion is very important to our life because it helps people deal with life struggles and it can provide social support and encourage interpersonal trust with their teammates. Self-compassion has been linked to enhanced happiness, optimism, positive effect, love of learning (Neff & Lamb, 2009).

Research by Breines and Chan (2012) found that self-compassion lead to better performance and enhance motivation, and it enhances well-being (Gilbert & Irons, 2004). Researchers found relationship between emotional intelligence and self-compassion

(Heffernan, Griffin, McNulty, & Fitzpatrick, 2010; Hollis-Walker & Colosimo, 2011). The emotional intelligence has an effect in physical health, and mental, and academic performance (O´Boyle, Humphrey, Pollack, Hawver, & Story, 2010).

Self-compassion has three main elements: self-kindness, sense of common humanity, and mindfulness. Mindfulness means paying attention to your current experience instead of focusing on the past or the future (Thomas, 2011). It is a way to improve the quality of life and increases ability to be aware. There are five facets of mindfulness they are observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Kabat-Zinn, Lipworth, & Burney (1985) are the first on record to use mindfulness meditation training within sport; they reported that some of the U.S. Olympic team rowers who medaled reported the usefulness of mindfulness meditation in helping them optimize performance when racing. More recently, another group of researchers reported initial beneficial findings from mindfulness meditation for sport intervention (Kaufman et al., 2009; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011).

The analyses of their effectiveness have provided evidence that mindfulness-based interventions were effective in reducing anxiety (Hofmann, Sawyer, Witt & Oh, 2010) and symptoms of stress (Chiesa & Serretti, 2009). As well cognitive ability (Chiesa, Calati & Serretti, 2011). As cognitive ability (e.g. concentration) and emotion regulation strategies are prerequisites for peak performances in competitive sport it is apparent that mindfulness training could serve as a mental practice technique in competitive sport. Mindfulness facilitates the development of flow, a state of optimal functioning that is associated with peak performances (Csikszentmihalyi, 1990). Gardner and Moore (2004) assume that flow and mindfulness have a substantial conceptual overlap. Both concepts emphasize the mental task of being present in the moment and the self-forgotten concentration. Substantial and significant correlations were found between both constructs in elite French swimmers (Bernier, Thienot, Cordon & Fournier, 2009), archers and golfers (Kaufman, Glass, & Arnkoff, 2009), rowers (Pineau, Glass, Kaufman & Bernal, 2014) as well as runners (Pineau, 2013). Additionally, it was shown that after completing a mindfulness program, the level of perceived flow increased (Aherne, Moran & Longsdale, 2011; Kaufman et al., 2009). Although there is a general dearth of sport psychology literature on specific mindfulness and compassion interventions and programs to soccer athletes. Hence, we hope this study will be a contribute on this field.

The aim of these sequenced practices is ultimately to alter the form and frequency of suboptimal internal states and cultivate preferred mental and emotional states, such as being energetic, confident, and focused (Silananda, 2002). The purposeful regulation of internal experience is clearly defined as a vital aspect of mindfulness practice, by keeping the mental faculties in balance. Mindfulness training is relevant to the field of athletic training because it appears to support the development of a broad range of essential capacities including regulation of attention (Aherne et al., 2011; Birrer, Rothlin, & Morgan, 2012; Brown & Ryan, 2003; Moore, 2009),

arousal, and emotion (Birrer et al., 2012, Brown & Ryan, 2003); motivation and volition (Aherne et al., 2011; Deci & Ryan, 2000; Moore, 2009; Parto & Besharat, 2011; Thompson & Gauntlett-Gilbert, 2008); cognitive functions related to perception and motor control (Aherne et al., 2011); confidence and self-efficacy (Coholic, 2011; Dellbridge & Lubbe, 2009; Monshat, Khong, Hassed, Vella-Brodrick, Norrish, Burns, & Herrman, 2013); and skills related to coping (Biegel, Brown, Shapiro, & Schubert, 2009; Coholic, 2011; Dellbridge & Lubbe, 2009; Himelstein, Hastings, Shapiro & Heery, 2012; Monshat et al., 2013; Parto & Besharat, 2011; Wisner, Jones & Gwin, 2010), self-compassion (Mosewich et al., 2013), recovery, social connectedness, and leadership (Deci & Ryan, 2000; Monshat et al., 2013).

Hence, the purpose of the present study was to explore and examine the impact of new eight-sessions mindfulness-compassion training program (MBSSoccerP) for athletes.

MATERIAL AND METHODS

Participants

From the potential eligibility list of 120 athlete´s (the number of members on club lists from which the athletes were recruited), and after a first contact and checking for inclusion and exclusion criteria (time 0), 60 athlete´s gave their informed consent to participate in the study (see Figure 1).

The inclusion criteria for the study were that the athlete´s be actively competing at elite club level, be 18 years or older (taking into account the evaluation protocol and the intervention program that was designed for older athletes and also considering the personality evaluation that was previously made to excluded personality disorders diagnosis), and Portuguese language proficiency. Exclusion criteria are a likely mental disorder (for example: medical diagnosis of depression, anxiety, and consumption of psychiatric drugs), significant previous experience with mindfulness programs, being younger than 18.

Hence were randomly assigned to either the MBSoccerP group, or the control group, and were informed about their experimental condition. Due to various reasons (injuries, change of club) three athlete´s dropped out. At the end 28 were in the MBSoccerP condition and 29 were in the wait-list control condition.

The mean age of the participants (n= 57) was 25.79 years old, SD= 3.3 years. The groups apparently do not differ with regard to age, gender, years of practice and hours of soccer training per week (see Table 1).

Table 1. *Sample characteristics (n = 57)*

	MBSoccerP (n =28)		***Control (n= 29)***	
	M	***SD***	***M***	***SD***
Age	*25.68*	*3.42*	*25.90*	*3.18*
Global years of practice	*16.4*	*4.217*	*16.38*	*3.88*
Elite years of practice	*3.82*	*1.85*	*4.00*	*1.49*
Nº/hours of Soccer drills per week	*11.18*	*2.156*	*12.69*	*1.85*

Gender	***n***	***%***	***n***	***%***
Male	*28*	*100*	*29*	*100*
Nationality	***n***	***%***	***n***	***%***
Portugal	*19*	*67.9*	*25*	*86.2*
Brazil	*6*	*21.4*	*3*	*10.3*
Serbia	*0*	*0*	*1*	*3.4*
Guinea-Bissau	*2*	*7.1*	*0*	*0*
Ivory Coast	*1*	*3.6*	*0*	*0*

***Note**: n = number of participants; M = mean scores; SD = standard deviation; % = percentage*

Instruments

The 7-item Portuguese version of the *Acceptance and Action Questionnaire – II- AAQ- II* (Bond, Hayes, Baer, Carpenter, Guenole, Orcutt, Waltz, & Zettle, 2011; Portuguese version (Pinto-Gouveia, Gregório, Dinis, & Xavier, 2012) ranging on a 7- point likert scale from 1 (*never true*) to 7 (*always true*). This scale reflects the single domain of psychological inflexibility with higher scores indicating greater psychological inflexibility. The coefficient obtained in 7-item Portuguese version of AAQ-II ranging between .76 and .84. In this study we obtained α = .77.

The *Five Facet Mindfulness Questionnaire - FFMQ* (Baer, Smith, Hopkins, Krietemeyer, J., Toney, 2006, Portuguese version Gregório & Pinto Gouveia, 2011) is an instrument that was based on five factors include observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. The factors are measured through a 39-item self-report questionnaire. Responses are coded according to a 5-point likert scale from 1 (*never or very rarely true*) to 5 (*very often or always true*). The internal consistency is reasonable for the five facet scales with alphas ranging from .75 to .91. (Baer et al., 2006). In this study we obtained α = .84

The *Flow State Scale - DFS-2* (Jackson & Eklund, 2002, Portuguese version Gouveia, Pais-Ribeiro, Marques, & Carvalho, 2012) is a 36-item self-report measure that was developed to assess intensity and frequency of the experience of flow in sport and physical activity. The measure has nine scales that represent Csikszentmihalyi's (1990) 29 dimensions of flow, each dimension measured by four items. Responses range on a 5-point likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The Portuguese version has an internal consistency of α =0.83. The DFS-2 have high internal reliability and validity (Jackson & Eklund, 2002). In this study we obtained α = .95

Self- Compassion Scale - SCS (Neff, 2003, Portuguese version Pinto-Gouveia & Castilho, 2011) was measured using the 26-item. The SCS consists of six subscales. Responses are made on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). In this study we obtained α = .83

The *White Bear Suppression Inventory – WBSI* (Wegner & Zanakos, 1994, Portuguese version Pinto-Gouveia & Albuquerque, 2007) is a 15-item measure designed to assess thought suppression. Items are scored on a 5-point likert scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Responses are coded such that high

scores reflect greater thought suppression. In this study we obtained α = .78

Brief Symptom Inventory - BSI (Degoratis, 1993, Portuguese version Canavarro, 1999. This questionnaire is the short version of the SCL-90R (Degoratis, 1983). The 53 items assess nine primary symptom dimensions. A total scale score of the BSI (Global Symptom Index, GSI) of T > 60 indicates a significant level of symptomatology. In this study we obtained α = .96

Athlete's - FAIP-A (Carraça, Serpa, Palmi, & Rosado, 2013) and *Coach´s - FAIP-T* (Carraça, Serpa, Palmi,& Rosado, 2013) Performance Self-Rating Scale. This self-rating scale is a 11-item measure, which involves a 5-point likert scale that spans between 1 (*very poor*) to 5 (*very good*). The scale is a direct measure of perceived athletic performance that consists basic constituents of performance like concentration, strength, competitiveness (global performance), motivation, quickness, fitness, endurance, mechanics, aggressiveness, agility, and team cohesion. The scale was designed based on Wolanin's (2005) development of a similar athlete´s and coach's rating scale used in a preliminary study of the MAC approach. The FAIP-T in this study has an internal consistency of α = .84, and FAIP-A in this study has an α = .83

Procedures

Elite soccer athletes were recruited from the 2ª Portuguese league and the study has been approved by the Human Kinetics Faculty Ethics Committee-Lisbon University. After ethical approval, MBSoccerP participants were assessed at pre-intervention (time 1), post-intervention (time 2), and were randomly assigned to MBSoccerP intervention.

Participant recruitment started on 14th January 2014 and closed on 14th February 2014. Baseline pre-intervention measures for all participants were completed on 6th March 2014. The eight-week intervention started on 6th March 2014 and was completed on 24th April 2014.

Participants gave informed consent and completed a series of questionnaires at all assessment time points. Participants names were coded in the data file for anonymization and the code key was stored in a different file in order to control for potential effects on outcomes (Boot, Simons, Stothart, & Stutts, 2013).

Intervention design

The experimental group participated in the 8-week MBSoccerP program. In each session, a mixed of psycho-education about mindfulness enhance sport performance, psychological skills training and its effects, as well as compassion, acceptance and commitment exercises were conducted. Orienting on MBSoccerP, different exercises such as centering, breathe meditation, compassion imagery, defusion metaphors, values and goals, action plans, informal and formal mindfulness (body scan, silent walk retreat, etc.) were used (see table 2). Each session had duration of 90/120 minutes and the first 60/90 minutes were used to practice either mindfulness or other 3º CBT wave sport psychological techniques. The remaining 30/45 minutes of each session was used to answer group dynamic questions, hatha yoga/stretching exercises, role plays, fill worksheets concerning lectures in 3º

CBT wave sport psychology skills training. All sessions and home-based exercises-meditation are based on the modified mindfulness-based stress reduction (MBSR) (Kabat-Zinn, 2013), Mindfulness Acceptance and Commitment program (Gardner & Moore, 2004), and compassion mind training (Gilbert, 2009; Tirch, 2010) material (see table 2). At the end of the eight-week period, all participants were asked to complete the post-test protocol. Control group athletes were offered the mindfulness training intervention after completion of the study. A more detailed progression of participant's trough MBSoccerP study is outlined in Figure 1.

MBSoccerP TRAINING FOR ELITE SOCCER PLAYERS

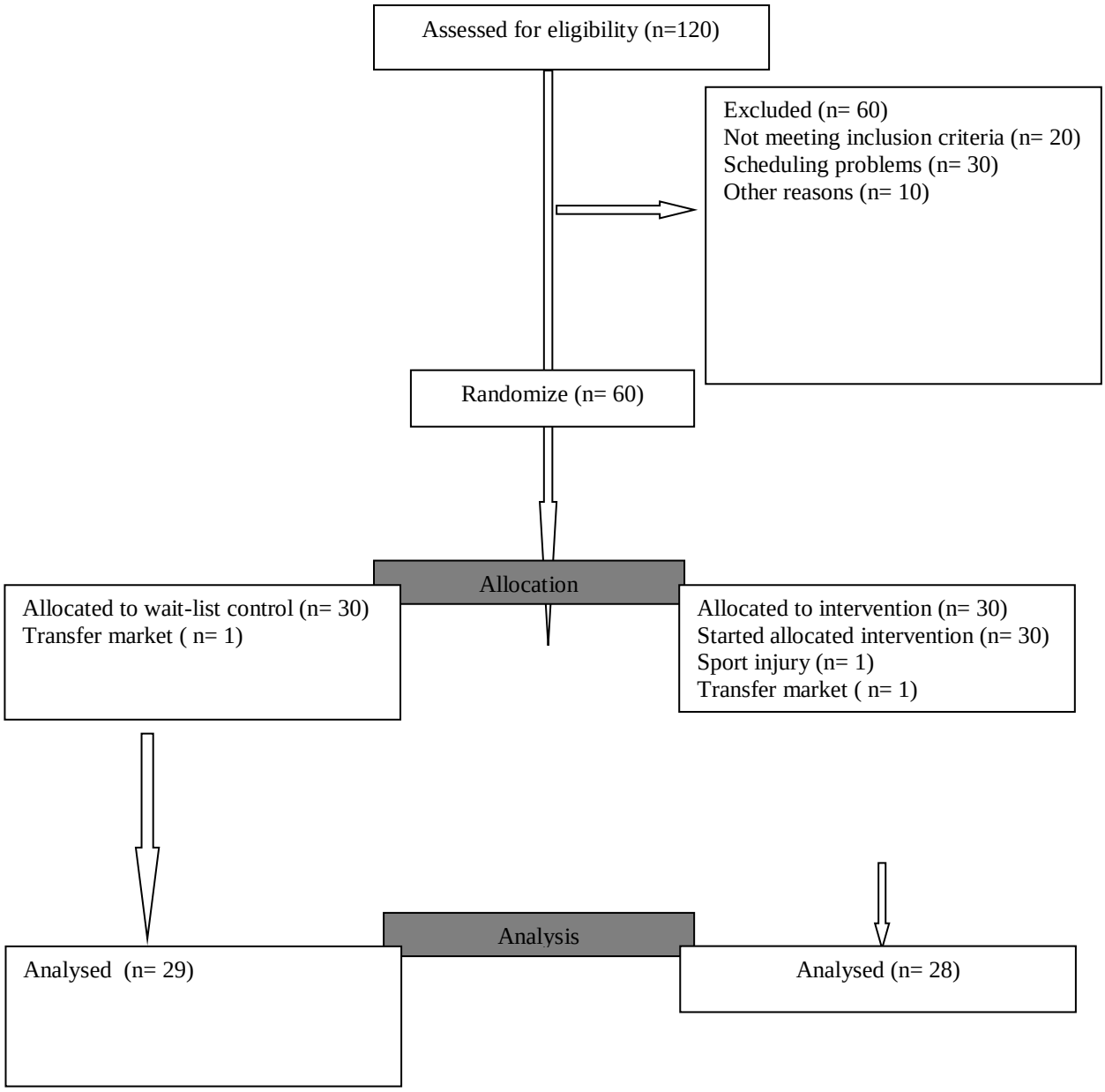

Figure 1 Progression of participants through MBSoccerP study.

Note: Flowchart based on Schulz, Altman, and Moher (2010).

Table 2. Mindfulness-Based Soccer Training Structure (MBSoccerP)

Sessions	Key concepts/Learning Goals	Experiential and Psycho-educational Training	After-Session Assignment
1- Introduction to MBSoccerP Mindfulness and sports	-Definition of Mindfulness; -Definition of Flow -Stress:Responding *vs.* Reacting to Stimulus; -Awareness the best mental tool; - Attention; - The mindful athlete	-3 Minutes meditation - Mindful breathing - Mindful eating	- Breath Meditation - STOP technique - Check in to informal and formal practice - Selected pre, match and post match worksheets - Simple Awareness and/or Mindful Eating
2 - Mindfulness of the Body and mind- self-talk	- Body as a anchor to present/conduit for experience; - Pleasant & Unpleasant *vs.* mindfulness and positive & negative thinking experiences; - Automatic pilot and sport mechanics	- Body Scan - Raisin exercise - The mindfulness solution: Aware, Accept and Action mindfulness and self talk: red thoughts means stop; yellow is neutral and green is go ("I can do it"); - Metaphor feed the tiger/unwelcome party guest	- Body Scan -Selected Readings/worksheets Remember and repete: Aware, Accept and Action -Body Scan, Sitting Meditation. - Pleasant Events Calendar
3 - Mindfulness and Goal Setting versus Process Goals	- How mind hold the body back; -Goals and Values; - Performance values	-Process goals exercise- ARMS: Action oriented, Realistic, measurable; sequential Performance values and value-driven behavior: Mind is not your friend, and thank your mind, the voice in my head. Mindful yoga Smart Goals: Soothing-Supportive; Specific; Meaningful; accountable/attach/Associate; resources; Time. - Introducing mindful yoga for beginners	- Kindness Meditation - Meditation on Smart Phone App/ email audio exercise -Selected Readings/Worksheets /defusion rate form Mindful Yoga (Yoga 1), Body Scan, Sitting. - Unpleasant Events Calendar

Table 2. Mindfulness-Based Soccer Training Structure (MBSoccerP) (Cont.)

4 - Building a Mindfulness Practice	- Formal *vs*. informal practice -Integrating practice and competition -Finding a home in the body - Helpful practice for athletes Commitment **Thoughts** -Content and physically experienced processes; - Removing judgment and self-criticism; Cognitive fusion -Methods of experiencing thought (timing, counting, listening, thought process visualizations)	-Mindfulness of thoughts - Mindful yoga	-Noting Meditation -Relax, Ground, and Clear Meditation -Mediation on thoughts, Smart Phone App/ email audio exercise -Selected Readings/ Worksheets STOP: The One Minute Breathing Space Mindful Yoga (Yoga 2) and Sitting
5 - Emotions , meaning in sports life. Radical acceptance	-What are emotions and physical sensations; -No Bad or shameful emotions -Identifying/ labeling to mitigate impact; Experiential avoidance - Emotion lifespan; - Mindfulness of emotions pre, match, post match	- Finding a home in the body Mindful yoga -Values and committed action Importance of acceptance versus resignation Letting go RAIN four step process: Recognize, Allow, Investigate, and Non-Identification	-Finding a home in the body -Creating a Practising commited action Everything is perfect as it is -Ongoing formal and informal practice
6 - Mindfulness and imagery	Flow Exposure Sport mindfulness Common problems Focus on the task	Mindful yoga Imagery as a tool to. Recall success; Rehearse a game plan; remain focused; remind your goal Compassion imagery exercise on sport context. Awareness of your best performance. Review of 3 A´s of mindfulness: Aware, Accept and Action	Ongoing practice Compassion imagery Remember and repeat: Aware, Accept and Action Selected pre, match and post match worksheets Body Scan, Sitting, Yoga (+ Mountain or Lake Med.)

Table 2. Mindfulness-Based Soccer Training Structure (MBSoccerP) (Cont.)

6a - Silent mindful running and self compassion		Silent Mindful Walking/mindful running in nature (90-120 minutes) The compassionate letters	Ongoing practice - Mindfulness in breathing one minute meditation - Mindful walking - Body scan Receiving affection from friends, strangers and enemies - Metta (to others and oneself)
7 - Mindfulness Acceptance and Compassion-Body connection & athlete recovery	Ways of training compassion: receiving compassion, showing compassion to oneself and to others Fear of compassion. Shame	Mindfulness of emotions Mindful yoga Loving Kindness Exercise/compassion flow/imagery The compassionate letters experience review	Ongoing practice Breathing practice - 3-minute breathing space in pairs - Closing metta Body Scan, Sitting, Yoga *(+* Lovingkindness) Mindful Eating, STOP, etc
8 - Ending MBSoccerP		Body scan review Compassion sport imagery Defusion, values, flow and acceptance review. Mindful yoga	Enhance ongoing MBSoccerP practice

Data analysis

The statistical analyses were conducted using IBM SPSS Statistics 23. The first step was to control and to correct for item-nonresponse. In the second step, descriptive statistics were calculated for both groups on all measurement occasions. Paired-sample t-tests were used in order to examine in-group differences among the intervention group and the control group. These statistics highlight natural changes in the control group, in comparisons to changes in the intervention group following exposure to the MBSoccerP. We also used independent sample t-tests, comparing changes scores for the intervention group to change scores of the control group. Using t-tests to compare change scores is an appropriate procedure for comparing pre and post-test differences for two samples with n ≤ 30. Finally, we used ANCOVAs to examine differences at post-test between the MBSoccerP intervention athlete´s and control group holding constant baseline scores. The Huynh-Feldt correction for ANCOVA was applied when epsilon is higher than 0.75, according to Girden (1992).

RESULTS

In- Group Comparisons from pre to post-test

Table 3 and 4 provide descriptive statistics for the intervention group and control group, respectively, on the different variables, for both the pre-test and post-test. Table 5 displays the results of this data analysis.

The intervention group has significant increases in mindfulness scores, specifically FFMQ act with awareness (t= 6.96 p <.01); FFMQ no react (t= 5.57 p <.01); and compassion scores, namely SCS Kindness (t= 3.32 p <.01); SCS Humanity (t= 3.64 p <.01); SCS Mindfulness (t= 6.97 p <.01); SCS total (t= 5.364 p <.01); DFS total (t= 16.44 p <.01); and decreased in psychological inflexibility (t= -1.91 p <.05); FFMQ no react (t= -5.57 p <.01); BSI (t= -2.58 p <.01); and BSI anxiety (t= -4.32 p <.01); and thought supressions – WBSI total (t= -13.7 p <.01); and FAIP-T (t= 3.87 p <.01).

The control group has significant increases in psychological inflexibility – AAQ-II (t= 5.263; p<.05); BSI (t=2.63 p <.05); BSI anxiety (t= 3.16 p <.05); and decreased DFS total (t=-.32.61 p <.01); SCS-SJudgment (t=-2.29 p <.05);and overall mindfulness, namely FFMQ describe (t=-2.33 p <.01); FFMQ act with awareness (t=-3.32 p <.01); FFMQ no react (t= 3.96 p <.01); FFMQ nojudgment (t= -4.72 p <.01)

There were no significant in-group differences from pre to post-test for the SCS- Isolation; SCS-Overl; and FAIP-A subscales.

Table 3. *Descriptive statistics pre-test and post-test control group*

	Control group (n=29)			
	Pre		Post	
	M	**SD**	**M**	**SD**
AAQ-II tot	17.5	7.250	19.89	4.640
FFMQ Des	3.30	.508	3.13	.521
FFMQ A.A	3.8	.683	3.59	.593
FFMQ N-R	3.05	.382	2.78	.443
FFMQ N-Jg	2.81	.624	3.23	.602
DFS2 total	29.99	2.7	45.73	3.34
DFS2 C.Tk	3.76	.486	3.80	.484
DFS2 D.Cp.	4.06	.466	3.96	.384
DFS2 Im.Ac	3.56	.498	3.56	.549
DFS2 C. Gls	4.39	.426	4.18	.416
DFS2 U.Fd	3.96	.601	4.03	.445
DFS2 Self.A	3.31	.730	3.43	.691
DFS2 TimT	3.22	.701	3.16	.531
DFS2 S.Con	3.72	576	3.86	3.57
WBSI total	47.89	7.35	46.62	6.01
BSI IGS	1.70	.435	1.56	.234
BSI_ Anx	1.66	.464	1.47	.283
SCS total	18.81	1.78	18.87	1.61
SCS_SK	2.87	.502	2.76	.511
SCS_C.H	3.11	.758	2.97	.548
SCS_ Md	3.20	.425	3.15	.456
FAIP-A Glo	3.69	.930	3.45	.783
FAIP-A Ag	3.66	.721	3.79	.902
FAIP-A C	3.62	.622	3.66	.553
FAIP-A St	4.07	.704	3.31	.712
FAIP-A Mo	4.07	.704	3.97	.778
FAIP-A Qui	3.79	.819	3.66	.553
FAIP-A End	3.45	.632	3.79	.726
FAIP-A Mc	3.86	.639	3.62	.561
FAIP-A Agi	3.79	.774	3.72	.702
FAIP-A TC	3.97	.626	3.83	.658
FAIP-A Fit	4.00	.707	3.55	.572
FAIP-T Glo	3.83	.711	3.62	.677
FAIP-T Ag	3.79	.726	3.62	.622
FAIP-T Con	3.79	.902	3.31	.604
FAIP-T St	3.76	.636	3.66	.614
FAIP-T Mot	3.59	.825	3.31	.712
FAIP-T Qui	3.66	.553	3.45	.506
FAIP-T End	3.76	.689	3.45	.632
FAIP-T Mc	3.83	.539	3.62	.561
FAIP-T Agi	3.79	.559	3.62	.561
FAIP-T TC	4.03	.566	3.83	.658
FAIP-T Fit.	3.66	.721	3.55	.572

Table 4. *Descriptive statistics pre-test and post-test experimental group*

	MBSoccerP (n=28)			
	Pre		Post	
	M	**SD**	**M**	**SD**
AAQ-II tot	22.31	6.030	18.10	4.639
FFMQ Des	3.49	.590	3.65	.356
FFMQ A.A	4.06	.747	4.20	.332
FFMQ N-R	2.79	.637	3.59	.438
FFMQ N-Jg	3.58	.559	3.80	.524
DFS2 total	30.0	5.27	48.38	4.23
DFS2 C.Tk	4.00	.971	4.16	.442
DFS2 D.Cp.	4.23	.770	4.27	.402
DFS2 Im.Ac	3.22	.782	3.86	.463
DFS2 C. Gls	4.38	.820	4.47	.458
DFS2 U.Fd	3.99	.759	4.07	.402
DFS2 Self.A	3.37	1.00	3.60	.654
DFS2 TimT	2.92	.704	3.26	.711
DFS2 S.Con	3.88	.753	4.04	.441
WBSI total	47.21	8.34	33.64	8.65
BSI IGS	1.54	.361	1.43	.236
BSI_ Anx	1.54	.325	1.29	.201
SCS total	20.44	2.99	22.63	2.38
SCS_SK	3.10	.704	3.54	.667
SCS_C.H	3.35	.843	3.76	.715
SCS_ Md	3.26	.675	4.01	.502
FAIP-A Glo	3.79	1.26	3.86	.756
FAIP-A Ag	3.96	1.07	3.68	.905
FAIP-A C	3.64	1.37	3.86	.848
FAIP-A St	4.25	1.24	4.50	.694
FAIP-A Mo	4.25	1.24	4.36	.731
FAIP-A Qui	3.79	1.17	3.86	.803
FAIP-A End	3.75	1.21	3.96	.693
FAIP-A Mc	3.57	1.10	3.93	.663
FAIP-A Agi	3.50	1.14	3.86	.705
FAIP-A TC	3.82	1.06	4.61	.497
FAIP-A Fit	3.89	.629	4.07	.539
FAIP-T Glo	3.71	.460	4.07	.466
FAIP-T Ag	3.68	.863	3.82	.819
FAIP-T Con	3.68	.905	4.43	.742
FAIP-T St	3.86	1.01	4.11	.832
FAIP-T Mot	3.64	.989	4.50	.694
FAIP-T Qui	3.86	.803	3.86	.848
FAIP-T End	3.64	.826	3.96	.693
FAIP-T Mc	3.79	.686	3.93	.663
FAIP-T Agi	3.75	.645	3.86	.651
FAIP-T TC	3.79	.630	4.61	.497
FAIP-T Fit.	3.50	.882	4.07	.539

Note: *M*= Mean scores, *SD*= standard deviations.

Table 5- *Paired sample t-test*

Measures	*t*-score experimental	*t*-score control
AAQ-II	-1,914*	5,263**
DFS – total	16,443**	-32,612**
SCS-Kindness	3.317**	1.428
SCS – Humanity	3.635**	1.254
SCS- Isol	-1.209	-.154
SCS-Mindfulness	6.971**	.664
SCS-Overl	-.506	-.574
SCS-SJudgment	-3.274**	-2.289*
SCS-total	5.364**	-.204
FFMQ-Describe	-1.551	2.333**
FFMQ-ActAwareness	6.958**	-3.324**
FFMQ-Noreact	5.568**	- 3.955**
FFMQ-noJudgment	-1.568	-4.716**
BSI	-2.583**	2.626*
BSI-anxiety	- 4.323**	3.155*
WBSI total	- 13.739**	.401
FAIP-A	-.941	1.361
FAIP-T	3.873**	1.236

Note: p <.05*; p <.01**
Positive t-scores indicate an increased rating from pre-test to post-test.

Independent samples t-test for change scores

Change scores from pre to post-test were calculated on all scales for each participants. Mean change scores for each group were then compared using independent sample t-tests. Table 6 shows all significant findings from these analyses. The intervention group had significantly greater increases in scores from pre to post-test on the mindfulness subscales no react (t= 6.73; p<.01) and describe (t= 2.592; p<.05); FAIP-T (t= 2.92; p<.01); and self-compassion subscales, respectively SCS-mindfulness (t= 6.07; p<.01); SCS – Humanity (t= 3.48; p<.01) and SCS-Kindness (t= 3.61; p<.01).

The control group though had significantly greater increases in scores on the the psychological inflexibility scale (t= -4.43; p<0.05) and though

suppression (t= -7.58; p<.01), and BSI anxiety (t= -.643; p<.05).

No significant differences were found for change scores on any DFS-total scale, sel-compassion subscales, respectively SCS Isolation and Overl, BSI, FAIP-A.

Table 6. *Independent samples t-test for change scores*

Measures	Intervention change (*M,SD*)	Control change (*M,SD*)	*t*-Score
AAQ-II	2.43; 6.71	-4.207; 4.304	-4.425 **
DFS – total	.277; .673	.037; .278	-1.77
SCS-Kindness	.436; .695	-.1.103; .416	3.614**
SCS – Humanity	.411; 598	-.138; .592	3.48**
SCS- Isol	.1696; .74241	.0172; .60108	.397
SCS-Mindfulness	.7500; .56928	-.0517; .41929	6.069**
SCS-Overl	.044; .467	.069; .65	.162
SCS-SJudgment	.3786; .61183	.2759; .64899	-.614
SCS-total	2.1893; 2.15983	.0621; 1.63700	4.2*
FFMQ-Describe	.1607; .5484	-.1638; .378	2.592*
FFMQ-ActAwareness	.1295; .797	-,1767; ,55853	1.675
FFMQ-Noreact	.8061; 766	-.2709; .3689	6.725**
FFMQ-noJudgment	.214; .723	.4181; .4774	1.260
BSI	-.1098; .22502	-.1477; .3029	-.534
BSI-anxiety	-.250; .30598	-.1954; .3335	-.643*
WBSI total	-14.25; 5.489	-.586; 7.87	-7.577**
FAIP-A	.143; .803	-.1034; .409	-1.451
FAIP-T	.356; .488	-.207; .902	2.92**

Note: p <.05*; p <.01**

Negative mean scores indicate a decreased score from pre-test to post-test; positive mean scores indicate an increased score from pre-test to post-test.

Positive t-scores indicate that the intervention group had a greater increase in ratings on that scale from pre-test to post-test. Negative t-scores indicate that the control group had a greater increase in ratings on that scale from pre-test to post-test.

Effect of the MBSoccerP Intervention

The results of the analysis of covariance with repeated measurements show that MBSoccerP intervention has a significant effect (see Table 7) on enhance direct and indirect sport performance attributes. This means that the overall attributes scores significantly change over time intervention. The two-way interactions between pre and pos-test as also significantly influence development of FFMQ, SCS, AAQ- II, FAIP-A, FAIP-T, WBSI, BSI_anxiety and DFS 2. Intervention and post-intervention phases were obviously higher than that of the baseline, implying that the intervention was effective in leading to an overall improvement on enhances sport performance characteristics on elite soccer athletes.

In the intervention group, the mean of DFS 2 (indirect measure of performance), and direct performance measures FAIP-A and FAIP-T increases over MBSoccerP intervention time (see table 7). DFS 2 Eta-square .197 (p= .003) indicating that the interaction between pre and post- test explains about 20% of the within-person variance of dispositional flow. FAIP-A Eta-square .136 (p= .005), explain about 14% of within-person variance of athlete performance. FAIP-T Eta-square .197 (p= .003), explain about 20% of within- person variance of athletes performance evaluated by the

coach. Taken together, MBSoccerP training had a strong effect for the athletes (see table 3).

Table 3. shows that Athletes in the MBSoccerP condition showed greater increases in mindfulness facets than the control group, as shown by an ANCOVA in which group condition was the independent variable, baseline FFMQ dimensions was the covariate, and post-test FFMQ dimensions was the dependent variable, FFMQ_ act with awareness F(1.54)= 19.000, p= .000, η2= .260 and FFMQ_non react F(1.54)= 53.909, p= .000, η2= .500. In this study we were not able to use the FFMQ total score because the participants had no experience in mindfulness meditation training, so according to the authors of the original FFMQ questionnaire (Baer et al., 2006), the Observe dimension of the FFMQ should not be considered.

In an ANCOVA in which group was the independent variables, at baseline DFS 2 total and dimensions was the covariate, and post-test DFS 2 total and sub-scales were the dependent variables, athletes in the MBSoccerP training condition showed greater increases in DFS_Concentration Task F(1.54)= 12.031, p= .000, η2= .308; DFS_Autotélic experience F(1.54)= 7.431, p= .001, .216; DFS_Clear goals F(1.54)= 6.865, p= .004, η2= .188; DFS_ Unambiguous Feedback F(1.54)= 11.142, p= .000, η2= .292; DFS_ loss of self-awareness F(1.54)= 6.865, p= .002, η2= .203 and DFS_Challenge/S.B. F(1.54)= 7.605, p= .008, η2= .273 . The increase in global flow for the intervention group was F (1.54) = 6.636, p= .003, η2= .197.

An ANCOVA in which baseline SCS_Common Humanity, SCS_Mindfulness and SCS_Self-kindness characteristics were the covariates showed that athletes in the MBSoccerP training condition did show significantly increases in experienced Self-Compassion characteristics relative to control group, SCS_ Common Humanity F(1.54)= 27.129, p= .000, η2 = .334; SCS_Mindfulness F(1.54)= 60.648, p= .000, η2= .529; SCS_Self-kindness F(1.54)= 23.531, p= .000, η2= .304. Even though there was significant difference between groups, the increase in the frequency of Self-Compassion characteristics experienced among the MBSoccerP group was significant.

Controlling for baseline thought suppression levels in an ANCOVA, athletes in the MBSoccerP condition showed a less suppression attribution style at post-test, relative to control group, F(1.54)= 70.794, p= .000, η2= .567. The decrease in thought suppression between pre- and post-test among the intervention group was significant.

An ANCOVA controlling for baseline BSI_anxiety levels showed that the MBSoccerP group were significantly less anxious than the control group at post-test, F(1.54)= 5.984, p= .018, η2= .100. The decrease in anxiety among the intervention group was significant from pre- to posttest.

Controlling for baseline psychological flexibility versus experiential avoidance levels in an ANCOVA, athletes in the MBSoccerP condition showed a less experiential avoidance at post-test, relative to control group, F(1.54)=12.997, p= .001, η2= .194. The decrease in experiential avoidance between pre- and post-test among the intervention group was significant.

An ANCOVA in which baseline FAIP-A_Concentration, FAIP-A_Motivation, FAIP-A_Strength, and FAIP-A_Team Cohesion, characteristics were the covariates showed that athletes in the MBSoccerP training condition did show

significantly greater increases in experienced direct performance characteristics relative to control group, FAIP-A_Concentration F(1.54)= 10.027, p= .003, η2 = .157; FAIP-A_Motivation F(1.54)= 39.432, p= .000, η2= .422; FAIP-A_Strength F(1.54)= 4.348, p= .042, η2= .075 and FAIP-A_Team Cohesion F(1.54)= 24.883, p= .000, η2= .315. Controlling for baseline FAIP-T dimensions in an ANCOVA, athletes in the MBSoccerP condition showed significant increases on all direct performance dimensions style at post-test evaluated by the coach, relative to control group, FAIP-T_Mechanic F(1.54)= 13.487, p= .000, η2= .333; FAIP-T_Aggression F(1.54)= 4.492, p= .016, η2= .143; FAIP-T_Concentration F(1.54)= 47.942, p= .000, η2= .640; FAIP-T_Strength F(1.54)= 22.543, p= .000, η2= .455; FAIP-T_Motivation F(1.54)= 41.093, p= .000, η2= .603; FAIP-T_Quickness F(1.54)= 25.347, p= .000, η2= .484; FAIP-T_Endurance F(1.54)= 12.798, p= .000, η2= .322; FAIP-T_Agility F(1.54)= 13.343, p= .000, η2= .322; FAIP-T_Team Cohesion F(1.54)= 17.456, p= .000, η2= .393 and FAIP-T_Fitness F(1.54)= 13.606, p= .000, η2= .335.

Table 7. Analysis of covariance with repeated measurements on MBSoccerP (n = 28)

Variables	SS	df	MSS	F	*p*	(η2)
WBSI	2542.909	1	2542.909	70.794	.000***	.567
AAQ-II	133.103	1	133.103	12.997	.001**	.194
SCS-C.Humanity	6.023	1	6.023	27.129	.000***	.334
SCS-Mindfulness	9.876	1	9.876	60.648	.000***	.529
SCS-SKind	5.867	1	5.867	23.531	.000***	.304
BSI-Anxiety	.234	1	.234	5.984	.018*	.100
DFS 2 Total	176.439	2	88.220	6.636	.003**	.197
DFS 2-Concentr. Task	67.372	2	33.686	12.031	.000***	.308
DFS 2-Challenge/S.B.	16.180	1	16.180	7.605	.008**	.273
DFS 2-Autot.Exp.	46.764	2	23.382	7.431	.001**	.216
DFS 2- C.Goals	35.412	2	17.706	6.269	.004**	.188
DFS 2-Un. Fdbk	46.412	2	23.206	11.142	.000***	.292
DFS 2-Loss-Self-awaren.	82.243	2	41.122	6.865	.002**	.203
FAIP-A_Concentra.	3.435	1	3.435	10.027	.003**	.157
FAIP-A_Motivation	19.240	1	19.240	39.432	.000***	.422
FAIP-A_Strength	2.170	1	2.170	4.348	.042*	.075
FAIP-A_T.Cohesion	8.662	1	8.662	24.883	.000***	.315
FAIP-A_Global Perf	2.928	1	2.928	8.478	.005**	.136
FAIP-T_Global Perf.	4.244	2	2.122	6.610	.003**	.197
FAIP-T _Mechanic	7.340	2	3.670	13.487	.000***	.333
FAIP- T_Aggress.	4.209	2	2.104	4.492	.016*	.143
FAIP-T_Concentra.	27.430	2	13.715	47.942	.000***	.640
FAIP-T_Strength	14.625	2	7.312	22.543	.000***	.455
FAIP-T_Motivation	28.586	2	14.293	41.093	.000***	.603
FAIP-T_ Quick.	14.034	2	7.017	25.347	.000***	.484
FAIP-T_ Endurance	8.982	2	4.491	12.798	.000***	.322
FAIP-T_ Agility	6.963	2	3.481	13.343	.000***	.331
FAIP-T_ TeamC.	10.788	2	5.394	17.456	.000***	.393
FAIP-T_ Fitness	6.996	2	3.498	13.606	.000***	.335
FFMQ-Act Awareness	3.805	1	3.805	19.000	.000***	.260
FFMQ- Non-React	10.038	1	10.038	53.909	.000***	.500

Note SS = some of squares; df = degree of freedom; MSS = mean sum of squares; p = probability value; η2 = partial eta square. Significant at p < .05 * significant at p < .01 ** significant at p < .001***.

DISCUSSIONS

The MBSoccerP program was developed for elite soccer athletes. This study was a first step to evaluate the efficacy of this program in comparison to an established control group. The results of this study suggest that MBSoccerP training had a significant effect. Participants of the MBSoccerP increased their indirect and direct elite performance scores when compared with control group.

Athletes in the MBSoccerP intervention showed greater increases in mindfulness facets, psychological flexibility, self-compassion and flow than control group participants. Greater increases in mindfulness in intervention participants between baseline and post-test were related to greater increases in compassion, psychological flexibility and flow. These outcomes of the eight-week MBSoccerP program extend the promising findings of the effects of mindfulness based interventions on flow and sport performance in other types of elite sports (Aherne et al., 2011; Briegel-Jones, Knowles, Eubank, Giannoulatos, & Elliot, 2013; Demarzo, Oliveira, Silva, Lessa-Moreno, Barceló, & Garcia-Campayo, 2015; Jekauc, Kittler & Schlagheck, 2017).

Mindfulness and flow increases among the soccer players in the MBSoccerP condition. The findings are consistent with components of mindful-compassion, acceptance and commitment hexaflex model (Gardner & Moore, 2012; Luoma, Kohlenberg, Hayes & Fletcher, 2012; Tirch, 2010) and flow theory relating to the ability to narrowly focus attention to facilitate the fulfillment of preconditions of flow and the ability to sustain attention to remain in a flow state (Nakamura & Csikszentmihalyi, 2009). The findings, along with previous empirical research findings (Kawabata & Mallett, 2011), suggest a sequential relationship among flow factors, in which mindfulness (non-react and act with awareness), experiential acceptance, self-kindness and common humanity, enables preconditions of flow which then facilitate the characteristics that define the experience of being in a flow state.

The inclusion of that components permitted soccer players to practice mindful compassion and acceptance techniques while they were experiencing sensations (e.g. discomfort) and thoughts (e.g. distressing cognitions regarding discomfort) central to their sport in a guided setting in which they were encouraged to observe naturally occurring events non-judgmentally, non-reactively and cultivating compassion flow in the game. So, the mindfulness-based intervention variably impacted on sport-anxiety and sport-related thought suppression. Athletes in the MBSoccerP condition were less anxious at post-test than control participants. However, athletes in the MBSoccerP condition showed fewer thought suppression at post-test than control group.

Birrer et al. (2012) and Gardner and Moore (2012) suggested that increases in mindfulness may modify the nature of the experience of emotions and cognitions such as anxiety and rumination rather than lessen them. Additional research with larger cohorts of athletes engaged in elite soccer and other different sports as well as different approaches to assessment of anxiety and suppression thoughts and peak performance may help to clarify these

matters. The anxiety aspect of the BSI in relation to mindfulness facets, psychological flexibility, self-compassion and flow may be an especially good focus for future investigation. The results of the study have practical implications for athletes and coaches. Together with findings of previous research, the results suggest that training athletes in MBSoccerP increases their mindfulness, experimental acceptance, self-compassion, flow and peak performance. Increasing athletes' mindfulness, compassion and psychological flexibility has implications for athletes' experience during sporting events as well as aspects of their life outside of sport (Demarzo et al., 2015; Haase, April, Falahpour, Isakovic, Simmons, Hickman, & Paulus, 2015). Further, the results of the study indicate that sport-specific mindfulness- based training increases athletes' experience of flow, a state beneficial for peak performance on elite athletes (Carraça, Serpa, Palmi & Rosado, 2018; Sole, Carraça, Serpa & Palmi, 2014, Palmi, & Solé, 2016; Jackson & Kimiecik, 2008).

CONCLUSIONS

The results of this study suggest that the Mindfulness- Based Soccer Program (MBSoccerP) is effective in increasing the attributes of mindfulness, compassion, psychological flexibility, and in which terms that mediates dispositional flow and peak performance on elite soccer players. This program seems to work as a stress and suppression thoughts buffer. However, further intervention studies with mediation analyses are needed to examine whether MBSoccerP has an influence on performance as well as its effect mechanisms and sustainability. This study represents a first step to establish the role of MBSoccerP training as a tool for improve peak performance in sport (Bernier, Thienot, Pelosse, & Fournier, 2014; Bertollo, Saltarelli & Robazza, 2009; Demarzo et al, 2015; Haase et al., 2015), and sport injury rehabilitation (Palmi, Planas, & Solé, 2018).

PRATICAL CONTRIBUTIONS

Further studies are needed to test the mechanisms in which way mindfulness facets, compassion and experiential acceptance influences sport performance on elite soccer context. Also, may employ biological measures (e.g., physiological or biomechanical parameters) in order to assess athletes training performance.

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