Journal of
Clinical and Biomedical Investigation

Research Article

Fernandes H., J Clin Biomed Invest 2024, 4:1

Recovery Supplementation Strategies Applied to Elite Soccer Players

Haniel Fernandes*

Estácio de Sá College, Nutrition Departament, Fortaleza, Ceará, Brasil

Correspondence to: Fernandes H, Estácio de Sá College, Nutrition Departament, Fortaleza, Ceará, Brasil.

Received date: August 20, 2024; **Accepted date:** August 31, 2024**; Published date:** September 06, 2024

Citation: Fernandes H. Recovery Supplementation Strategies Applied to Elite Soccer Players. *J Clin Biomed Invest.* 2024;4(1):4-6. doi: 10.52916/jcbi244030

ABSTRACT

Purpose of review: During soccer seasons, athletes have canned a 48 number of matches. Therefore, recovery supplementation strategies that optimize recovery and/or reduce the damage caused by the number of matches during a season are important to help elite football players in their state of recovery. This way, the purpose of this review is to provide a holistic view of the mainly recovery supplements and their effects on elite soccer players recovery, based on what the literature recommends decreasing the oxidative stress, muscle damage and help them in the status recovery.

Recent findings: Vitamin C e vitamin E in co-administration (500 mg vitamin C with 1200 IU vitamin E per day), 6 g per day of glutamine supplementation, and 60 mL drinks per day of Turmeric Original Shot (1400 mg curcumin combined with 10 mg of piperine), were able to decrease oxidative stress and lower rates of injury. 1000 mg magnesium citrate twice a day and 5000 IU (international units) cholecalciferol supplement daily were improving the recovery status. Coenzyme Q10 100 mg twice daily and omega 3 (550 mg DHA and 550 mg EPA) proven a reduction in the levels of the muscle-damage marker.

Summary: Recovery supplements should include the vitamin's C, E, and D, besides that glutamine, magnesium, and turmeric with piperine to be able supplements to help the elite soccer players recovery, decreasing oxidative stress and rates of injury.

Keywords

Vitamin, Reactive Oxygen Species (ROS), Glutamine, Coenzyme, Recovery Supplementation.

Introduction

The recovery and restoring pre-performance levels is considered a crucial element of success in elite soccer. Thus, to speed up this post-exercise recovery, coaches and athletes searching for effective strategies, mainly with scientific evidence, that show supplementation strategies to recover on this sport. Although precisely defining just a concept of “recovery from exercise” is a challenging mission due to the number of variables affecting an optimal recovery [1], a recovery supplements recommendation involving the main supplements can help the post-match and post-training week recovery into elite soccer players. As high-performance elite soccer athletes face a wide array of daily training stimuli and week matches, these efforts may not allow complete recoveries [2], thus, the current evidence highlights that enough and optimal recovery is necessary to prevent health problems and to achieve peak performance [3] and the choice of recovery strategies may be crucial. In terms of nutrition, the elite soccer players recovery supplements area is still little studied.

Because the athletes can make for season on soccer, an average 34 to 48 competitive matches, evaluated Premier League, La Liga, Serie A, Ligue 1, and, Bundesliga [4], include travels, trainings, different trainings, etc., worrying about muscle damage, oxidative stress and recovery status becomes inevitable. However, it has been proven by a recent systematic review and meta-analysis proved that the use of the recovery strategies for elite soccer players can offers positive effects on muscle damage [5] and to take this athletes to better performances, helping them to feel more rested [6]. This way, this review tries to fill in some gaps regarding recovery strategies for elite soccer players by a proposal with some supplements with their dosages to help these athletes on their recovery post-exercises, week training and matches.

The Metabolic Influence of Recovery Supplements on Adaptive Exercise Responses

The exercise increases the levels of reactive oxygen species (ROS) through various mechanisms. This triggers the activation of factor nuclear factor erythroid-derived 2-like 2 (Nrf2), a redox-sensitive transcription factor activated by increases in oxidative stress [7]. Their activation mitigates oxidative stress by increasing the nuclear transcription of many antioxidant genes while also mediating additional beneficial effects through the cytoprotective nature of Nrf2 signaling.

The antioxidant proteins in the mitochondria may be tagged for autophagy in the face of oxidative stress via stress-activated pathways decreasing their abundance and enzymatic function, thus impacting rates of reactive oxygen species (ROS) removal [8]. The major implications of elevated post-exercise mitochondrial reactive oxygen species (ROS) are that they could modulate redox sensitive cysteine residues throughout the entire proteome [9].

Briefly, during unstressed conditions Nrf2 remains bound to Keap1 in the cytosol. In response to oxidative stress, cysteine residues are modified on Keap1, resulting in the dissociation of the complex and the translocation of Nrf2 to the nucleus. This

activation of Nrf2 independent of oxidative stress, suggests that during exercise the energetic stress (AMP/ATP ratio) and/or oxidative stress could be acting alone or together to regulate redox adaptions to exercise training. In summary, the antioxidant supplementation may inhibit or try to reduce the signaling of exercise-induced ROS and thereby downstream Nrf2 signaling, improving the athlete recovery status.

Methods

The author searched PubMed and ScienceDirect databases for recent studies involving the recovery supplementation strategies of elite soccer players using the keywords "recovery", "soccer" and "supplements". In the total, 1367 results were obtained from ScienceDirect and 53 from PubMed. The inclusion criteria were studies that involved elite soccer players or endurance athletes, presented data on supplementation and recovery strategies at beginning and end of the season including the dosages commonly used by these athletes. The exclusion criterion had to do with study model, only clinical studies, systematic reviews, or meta-analyses of data were included to construct the table 1 with the recommendations for recovery supplements. There was no pre-established statistical calculation for the selected studies. The author identified the studies following the inclusion and exclusion criteria for the final analysis and structured a table (Table 1) with recovery supplements for elite soccer players and their specific dosages.

Table 1. A proposal of supplementation dosages for elite soccer players recovery.

Element	Dosage	Reference
Vitamin C	500 mg. d^{-1}	[10]
Vitamin E	1200 IU. d^{-1}	[10]
Glutamine	6 g. d^{-1}	[11]
Tumeric	1400 mg curcumin combined with 10 mg of piperine daily	[12]
Magnesium	1000 mg magnesium citrate twice a day 90 min before activity daily	[13]
Cholecalciferol	5000 IU cholecalciferol supplement daily	[14], [17]
CoQ10	100 mg twice daily	
DHA/EPA	550 mg DHA and 550 mg EPA daily	[16]
Abbreviations: CoQ10: Coenzyme Q10; EPA/DHA: Eicosapentaenoic acid/Docosahexaenoic acid; CHO: Carbohydrate; IU: International Units.		

Results

After the exclusion and inclusion criteria pre-defined by the author and previously announced in the methodology, 7 articles were then selected for analyzes regarding supplements and dosages for the recovery of elite football athletes. The use of vitamin C e vitamin E in co-administration (500 mg vitamin C with 1200 IU vitamin E per day) [10], 6 g per day of glutamine supplementation [11], and 60 mL drinks per day of Turmeric Original Shot (each containing 1400 mg curcumin combined with 10 mg of piperine) [12], were able help elite soccer players decrease oxidative stress and lower rates of injury. The supplementation 1000 mg magnesium citrate twice a day [13] and 5000 IU (international units) cholecalciferol supplement daily [14] were able to improve recovery status for elite soccer players. Coenzyme Q10 (CoQ10) supplementation in 100 mg twice daily [15] and omega 3 supplementation in capsules containing 550 mg DHA and 550 mg EPA [16] proven a reduction in the levels of the muscle-damage marker into elite soccer players, respectively.

Discussion

A recent systematic review has been proven that the use of recovery strategies offers significant positive effects on muscle damage highlighting the importance of post-match recovery strategies in soccer [5]. The supplement with antioxidants like vitamin C e vitamin E in co-administration it may be necessary to do the oxidative stress in soccer players after matches [10]. Besides that, the glutamine supplementation also was able to induce decreases in adrenocorticotropic and cortisol hormone levels, indicate that supplement could help attenuate exercise-induced muscle damage in sport disciplines with predominantly eccentric actions like elite soccer [11].

A decrease of both leg and whole-body soreness with a time interaction effect for plasma C-reactive protein reduction was observed after the elite soccer players consumed the Turmeric Original Shot drinks [12]. A chronic supplementation with 1000 mg magnesium citrate twice a day 90 min before each practice session was able to improve repeated sprint ability in elite soccer players [13], demonstrating aa significant role of magnesium ions in delaying fatigue during high-intensity exercise.

About the cholecalciferol use, elite soccer athletes were evaluated by blood cholecalciferol level, and was observed that athletes from the 25(OH)D-insufficient group (<30 ng/mL) may have a greater risk of respiratory tract infections and higher rates of injury, thus, the 25(OH)D-insufficient athletes group can be treated with 5000 IU (international units) cholecalciferol supplement daily [14]. A retrospective observational study in professional soccer players was proven vitamin D improves the serum level of injury-related hormones such as cortisol and testosterone [17].

An extensive recent review has evaluated the chronic intake of combined vitamin C and vitamin E appear effective at decreasing markers of exercise-induced oxidative stress and the coenzyme Q10 and vitamin C may improve vascular function [18]. It is important decrease muscle soreness by decrease creatine kinase blood concentrations following the eccentric exercises, a recent study evaluated the coenzyme Q10 (CoQ10) supplementation on the hardest phase in 100 mg twice daily and proven a reduction in the levels of the muscle-damage

marker creatine kinase and stress marker cortisol [11]. This was proven through an observation study with professional elite soccer players concluded that the athletes that was with a high plasma CoQ10 have lower rates of muscle damage and better kidney function.

Other work offered n-3PUFA (fish oil supplement) beverage that contained 1100 mg DHA/EPA (approximately 550 mg DHA and 550 mg EPA) for elite soccer players and showed the decrease in muscle soreness by decrease creatine kinase blood concentrations [16].

Conclusion

Vitamin's C, E, and D, besides that glutamine, magnesium, and turmeric with piperine, have been shown to be able supplements to help the elite soccer players recovery, decreasing oxidative stress and lower rates of injury, improving recovery status, and reduction the muscle-damage, having their dosages are proposal in Table 1. Finally, future research is needed to identify which resources are more effective at providing individual recovery strategies involving these and other supplements are necessary.

Funding

None.

Conflict of Interest

Author declares that he has no conflict of interest.

References

1. Terrados N, Mielgo-Ayuso J, Delextrat A, et al. Dietetic-nutritional, physical and physiological recovery methods post-competition in team sports. J Sports Med Phys Fitness. 2019;59(3):415-428.

2. Calleja-González J, Terrados N, Mielgo-Ayuso J, et al. Evidence-based post-exercise recovery strategies in basketball. *Phys Sportsmed.* 2016;44(1):74-78.

3. Minett GM, Costello JT. Specificity and context in post-exercise recovery: it is not a one-size-fits-all approach. *Front Physiol.* 2015;6:130.

4. Smith C. How Many Soccer Games Are There In a Season? *Soccer Prime.* 2023.

5. Altarriba-Bartes A, Peña J, Vicens-Bordas J, et al. Post-competition recovery strategies in elite male soccer players. Effects on performance: A systematic review and meta-analysis. *PLoS One.* 2020;15(10):e0240135.

6. Hausswirth C, Le Meur Y. Physiological and nutritional aspects of post-exercise recovery: specific recommendations for female athletes. *Sports Med.* 2011;41(10):861-882.

7. Fasipe B, Li S, Laher I. Harnessing the cardiovascular benefits of exercise: Are Nrf2 activators useful?. Sports Med Health Sci. 2021;3(2):70-79.

8. Jung T, Höhn A, Grune T. The proteasome and the degradation of oxidized proteins: Part II - protein oxidation and proteasomal degradation. *Redox Biol.* 2014;2:99-104.

9. Brigelius-Flohé R, Flohé L. Basic principles and emerging concepts in the redox control of transcription factors. *Antioxid Redox Signal.* 2011;15(8):2335-2381.

10. Higgins MR, Izadi A, Kaviani M. Antioxidants and Exercise Performance: With a Focus on Vitamin E and C Supplementation. *Int J Environ Res Public Health.* 2020;17(22):8452.

11. Córdova-Martínez A, Caballero-García A, Bello HJ, et al. Effect of Glutamine Supplementation on Muscular Damage Biomarkers in Professional Basketball Players. *Nutrients.* 2021;13(6):2073.

12. Clayton DJ, Burbeary R, Hennis PJ, et al. Turmeric supplementation improves markers of recovery in elite male footballers: a pilot study. *Front Nutr.* 2023;10:1175622.

13. Chycki J, Golas A, Halz M, et al. Chronic Ingestion of Sodium and Potassium Bicarbonate, with Potassium, Magnesium and Calcium Citrate Improves Anaerobic Performance in Elite Soccer Players. *Nutrients.* 2018;10(11):1610.

14. Bezuglov E, Tikhonova A, Zueva A, et al. The Dependence of Running Speed and Muscle Strength on the Serum Concentration of Vitamin D in Young Male Professional Football Players Residing in the Russian Federation. *Nutrients.* 2019;11(9):1960.

15. Sánchez-Cuesta A, Cortés-Rodríguez AB, Navas-Enamorado I, et al. High coenzyme Q10 plasma levels improve stress and damage markers in professional soccer players during competition. *Int J Vitam Nutr Res.* 2022;92(3-4):192-203.

16. Philpott JD, Donnelly C, Walshe IH, et al. Adding Fish Oil to Whey Protein, Leucine, and Carbohydrate Over a Six-Week Supplementation Period Attenuates Muscle Soreness Following Eccentric Exercise in Competitive Soccer Players. *Int J Sport Nutr Exerc Metab.* 2018;28(1):26-36

17. Lombardi G, Vitale JA, Logoluso S, et al. Circannual rhythm of plasmatic vitamin D levels and the association with markers of psychophysical stress in a cohort of Italian professional soccer players. *Chronobiol Int*. 2017;34(4):471-479.

18. Mason SA, Trewin AJ, Parker L, Wadley GD. Antioxidant supplements and endurance exercise: Current evidence and mechanistic insights. *Redox Biol.* 2020;35:101471.