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Letter to the Editor

Half-time hydration and re-warm-up strategies for football players

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We have read the commentary by Fernandes H (2024) [1] with interest on a mini-review entitled Hydration Strategies for Elite Soccer Players [2]. Given the popularity of the game globally and the busy tournament schedules without a break for the soccer players, their fitness remains a primary concern for the players and their coaches alike. Hence, elite soccer performance is crucial and depends on physiological readiness, technical skills, and tactical execution. Among many others [3], two key factors influencing the match performance of players are hydration and neuromuscular readiness. Hydration strategies are designed to prevent performance decline caused by fluid loss. In contrast, re-warm-up strategies aim to regain muscle readiness after periods of inactivity (half-time break). This article explores the relationship between hydration and re-warm-up strategies, incorporating recent developments and offering practical applications for soccer professionals.

Hydration: Beyond the Basics

Soccer players undergo significant dehydration during matches, which necessitates continuous monitoring of the hydration status of the players [4], with an average sweat loss exceeding 4 liters and body mass reductions of around 2.5 kilograms. Dehydration, exceeding 2% of body weight, impairs both cognitive and physical performance [5]. Recent research underscores the power of individualized hydration approaches, particularly sweat-sodium profiling and customized electrolyte intake. Wearable hydration monitors now offer real-time fluid balance assessments, putting the power of precision in your hands. Modern practices involve pre-match hydration status checks, customized electrolyte solutions based on sweat analysis, and real-time isotonic fluid consumption [6]. Post-game recovery protocols recommend a fluid intake of 150% relative to mass lost, combined with sodium-enriched beverages to facilitate fluid retention.

Re-Warm-Up: Enhancing Agility and Shooting Power

Short, targeted re-warm-up sessions have been shown to enhance agility and ball shooting velocity. A 4-minute session involving change-of-direction drills immediately before play can significantly boost performance. Recent studies suggest combining dynamic drills with short sprints to maximize performance enhancement (PAPE) effects [7]. The timing is crucial; re-warm-up activities performed about 8 minutes after the initial warm-up and close to match restart at half time are most effective. In brief, high-intensity, soccer-specific re-warm-ups help maintain muscle temperature, readiness, and neuromuscular efficiency without introducing fatigue.

The Synergy of Hydration and Re-Warm-Up

Emerging evidence indicates dehydration can blunt the effects of re-warm-up strategies

by reducing muscle glycogen availability and impairing neuromuscular efficiency. Thus, an integrated match-day protocol should coordinate hydration and re-warm-up practices.

Suggested protocol:

1. Pre-match individualized hydration.
2. Intra-match isotonic fluid consumption.
3. Halftime re-warm-up session consisting of COD drills or dynamic sprints.
4. Post-match rehydration with sodium-rich solutions.

This coordinated approach ensures optimal thermoregulation, muscle function, and cognitive sharpness throughout competition.

Recommendations for Coaches

Pre-Match (4 hours before):

- 5-7 mL/kg fluid intake.
- Sodium-enriched isotonic drinks.

During the match:

- 150-250 mL isotonic beverage every 15-20 minutes when possible.

Halftime:

- 2-3 minutes of active re-warm-up (e.g., four sets of 20 m COD sprints).
- Sips of carbohydrate-electrolyte solutions.

Post-Match:

- 1.5 L of fluids per kg body weight lost.
- Hypertonic solutions immediately after the match.

Position-specific adaptations, such as higher fluid turnover for midfielders and position-tailored.

Position-specific adaptations, such as higher fluid turnover for midfielders and position-tailored re-warm-up drills like agility drills for forwards and passing drills for midfielders, further enhance outcomes.

Future Directions and Research Gaps

Future research holds the promise of further enhancing soccer performance. Investigations into real-time hydration monitoring using wearable technology, AI-driven re-warm-up personalization based on player fatigue, and large-scale randomized trials integrating hydration and re-warm-up interventions are on the horizon, offering exciting possibilities for the future of sports science [8]. Technological advances promise to revolutionize soccer preparation strategies, offering moment-to-moment adjustments to maximize player performance [9].

Conclusion

Hydration and re-warm-up strategies, when used independently, enhance soccer performance. When integrated, they produce effects that maximize athlete output and resilience. Recent advancements in individualized fluid management, which involves tailoring hydration strategies to each player's unique needs based on factors like sweat rate and sodium loss, and re-warm-up designs, provide the coaches and physios with tools to elevate player readiness. Coordinated strategies tailored to players' physiological and positional demands represent the future frontier of soccer performance optimization. With the emergence of artificial intelligence, the intelligent development of youth football training promotes the high-quality development of youth football.

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