Hydration In Tennis Players

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FOREWORD

In recent years, tennis has evolved from a sport characterized by long rallies based on style and finesse into an athletic discipline centered on speed, power, and explosive strength. This evolution has increased the need for agility and anaerobic power, combined with high aerobic capacity, among tennis players. Although the average rally duration during matches is under 10 seconds, the possibility of matches lasting over five hours highlights the immense variability in the sport's physiological demands. Under these extreme and variable conditions whether in the critical moments of a fifth-set tiebreak in a Grand Slam final or during a training session under the scorching sun the line between victory and defeat is sometimes hidden in just a few milliliters of fluid loss.

Body fluid balance that is, hydration status is not merely a supporting factor in athletic success but a vital foundation for sustaining performance and athlete health. Scientific research has proven that even a fluid loss as low as 2% of body weight negatively impacts endurance, slows reaction times, and disrupts decision-making processes. In fact, it has been shown that fatigue can reduce shot accuracy by up to 81%. In light of these findings, the key to managing fatigue and optimizing performance lies in proper hydration strategies.

Tennis is typically played in environments characterized by high temperatures and humidity. It is known that a tennis player can lose more than 2.5 liters of sweat per hour during intense activity. However, since gastric emptying rarely exceeds 1.2 liters per hour, replenishing lost fluids and electrolytes presents a significant physiological challenge. Unfortunately, it is common even for elite-level athletes to start matches with inadequate hydration. This book offers a scientific roadmap for managing these critical challenges by focusing on tennis's explosive, stop-and-go nature, varying court surfaces, and different climatic conditions.

This work combines field and laboratory data to serve as a practical guide for coaches, sports scientists, athletes, and their families. Throughout the book, you will have the opportunity to explore not only the importance of water intake but also personalized hydration regimens, the role of electrolyte balance, and the effects of carbohydrate supplementation on absorption. The protocols we present are not based solely on theoretical knowledge; they are practical, measurable, and trackable on tennis courts.

I would like to thank all the academic advisors and field experts who contributed to the creation of this work. "Hydration in Tennis Players" will be as indispensable to the modern tennis player as the racket in their bag. I wish you sustained success on the court and boundless energy.

Oktay ÇOBAN ***Arizona State University, 2026***

LIST OF ABBREVIATIONS AND SYMBOLS

- ITF (International Tennis Federation): International Tennis Federation
- WUT (Weight, Urine, Thirst): Body Weight (W), Urine Color (U), and Thirst (T)
- USG (Urine Specific Gravity): Urine Specific Gravity
- CHO (Carbohydrate): Carbohydrate
- CHO-E (Carbohydrate-Electrolyte): Carbohydrate-Electrolyte
- WBGT (Wet-Bulb Globe Temperature): Wet-Bulb Globe Temperature
- VKK: Body Mass Loss
- RPE (Rating of Perceived Exertion): Perceived Exertion Level
- Tc (Core Temperature): Core Body Temperature
- HR (Heart Rate): Heart Rate
- EHN (Exercise-Associated Hyponatremia): Exercise-Associated Hyponatremia
- SCI (Spinal Cord Injury): Spinal Cord Injury
- DFI (Daily Fluid Intake): Daily Fluid Intake
- ACSM (American College of Sports Medicine): American College of Sports Medicine
- Uc (Urine Color): Urine Color
- EFSA (European Food Safety Authority): European Food Safety Authority.
- Na+ (Sodium): Sodium

ACKNOWLEDGMENTS

The process of writing this book, titled "Hydration in Tennis Players," has been an extremely valuable and instructive academic experience for me. Many individuals and institutions contributed to the completion of this study, which examines the topic of hydration a key area in sports science specifically as it pertains to tennis players.

I would like to express my heartfelt gratitude to Prof. Dr. Stavros KAVOURAS, whose knowledge and experience I benefited from throughout the preparation of this book and whose scientific perspective made significant contributions to my work

The fact that I wrote a significant portion of this book while at the Hydration Laboratory at Arizona State University one of the world's leading research centers was a major academic achievement for this project. I would like to thank Arizona State University and the Hydration Laboratory for providing me with a research environment during this process. Being part of an international academic environment not only helped me develop my scientific perspective but also made significant contributions to shaping the content of this book...

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Academic work is a long, demanding, and self-sacrificing process. I would like to thank my extended family, who have always been by my side and whose support and prayers I have felt throughout this journey. Their emotional support and understanding have helped me continue this work with greater strength and motivation.

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Finally, I hope this book will be of benefit to researchers, coaches, athletes, and students in the field of sports science.

Dr. Oktay ÇOBAN

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CHAPTER 1

THE BASICS OF HYDRATION AND ITS HEALTH IMPLICATIONS

Hydration

is a term related to the body's fluid balance and is recognized as a critical factor for both general health and athletic performance (Casa et al., 2019; Orrù et al., 2018). This process refers to the body's ability to balance daily fluid and electrolyte losses through intake (Presta et al., 2021). Maintaining hydration status is essential for the continuity of human life and homeostasis, including the maintenance of brain function (Dube et al., 2022; Zhang et al., 2022).

Basic Definitions of Hydration

The term "hydration" relates to the body's fluid balance and is a critical factor for both general health and athletic performance (Casa et al., 2019; Orrù et al., 2018).

Euhydration: This refers to a state where the body's water balance is normal (Barley et al., 2020). Euhydration reflects optimal hydration and serves as the most suitable starting point for training and competitions (Casa et al., 2019).

Hypohydration: This is a state where the body's water content is lower than normal (Barley et al., 2020). This condition is defined as having a water deficit greater than the individual's daily fluctuations (Dube et al., 2022).

Dehydration: A process in which total body water decreases as a result of fluid intake being less than fluid output (Dube et al., 2022; Lustosa, 2007).

Hyperhydration: This is a condition in which the body's water content is higher than normal; it typically results from excessive fluid intake and carries the risk of diluting plasma sodium levels (Sawka et al., 2007).