

# BEATING THE HEAT WITH IMPROVED SPORT NUTRITION WEBINAR – USTA SPORT SCIENCE

Page Love, MS, RDN,  
CSSD, LD, USPTA



# Be Aware of Heat Index: Increased Fluid/Sodium Needs in Higher Heat/Humidity

HEAT INDEX											
ENVIRONMENT TEMPERATURE [F°]											
	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°
Relative Humidity	Apparent Temperature*										
0%	64°	69°	73°	78°	83°	87°	91°	95°	99°	103°	107°
10%	65°	70°	75°	80°	85°	90°	95°	100°	105°	111°	116°
20%	66°	72°	77°	82°	87°	93°	99°	105°	112°	120°	130°
30%	67°	73°	78°	84°	90°	96°	104°	113°	123°	135°	148°
40%	68°	74°	79°	86°	93°	101°	110°	123°	137°	151°	
50%	69°	75°	81°	88°	96°	107°	120°	135°	150°		
60%	70°	76°	82°	90°	100°	114°	132°	149°			
70%	70°	77°	85°	93°	106°	124°	144°				
80%	71°	78°	86°	97°	113°	136°					
90%	71°	79°	88°	102°	122°						
100%	72°	80°	91°	108°							

\*Combined index of heat and humidity...what it “feels like” to the body.

APPARENT TEMPERATURE	HEAT STRESS RISK WITH PHYSICAL ACTIVITY AND/OR PROLONGED EXPOSURE
90° - 105°	Heat cramps or heat exhaustion possible
105° - 130°	Heat cramps or heat exhaustion likely, Heatstroke possible
130° and up	Heatstroke highly likely

Source: National Oceanic and Atmospheric Administration.

# ***What To Do If Your Player is Having Muscle Cramps and Heat Illness***

- Remove tight fitting clothing, players should wear light colored clothing, breathable material with loosely woven fabric and change clothing as becomes saturated with sweat
- Rest in a cool place
- Engage in Passive Stretching
- Massage
- Replace fluids and electrolytes (3% or more of body weight lost increases risk of heat illness)

# ***Heat Exhaustion vs Heat Stroke***

**Heat Exhaustion** - weakness, faintness, dizziness, headache, excessive thirst, vomiting, less urine volume, cold and clammy

**Tx:** Same treatment for muscle cramps but discontinue activity for 24 hours

**Heat Stroke** - drowsiness, hysteria, irritability, aggressiveness, disorientation, glassy state, rapid pulse and breathing, little or no sweating and hot dry skin

**Tx:** IMMEDIATELY CALL 911 and if possible immerse in full body cold water and if not available minimally a fan until helps arrives

# ***Players Need To Improve Off Court Fluids; What are Best Sources of Fluids for off Court Hydration?***

*Water*

*Sport Beverages*

*Juices*

*Shakes and Smoothies*

*Decaf beverages*

*Milk products*

*Best Practice: 12-16 cup or 3-4  
Liters /day minimum*



# ***Fluid Guidelines for Before, During, and After Play – NATA and ACSM Guidelines***

- **Before (water or sport beverage)**
  - Drink 12 to 16 oz (400-600 ml) 1-2 hours before
- **During (Drinking Every Changeover)**
  - Drink 4 to 8 oz (150-350 ml) every 15-20 minutes (Bring 2-3, 20 oz sport beverages and 2-3, 20 oz water); Higher sodium sport beverages needed in higher temperatures
- **After (sport beverage first, then water)**
  - Replace 150% of sweat losses
  - Drink 2-3 cups (16-24 oz) for every 1 lb weight lost through sweat or drink until urine is lemonade color

# USTA Sport Science Resources



USTA SPORT SCIENCE COMMITTEE

## Am I Hydrated?

Monitor your hydration based on  
your urine color

Urine Color Chart	
Hydrated	} Increase hydration
Hydrated	
May Be Dehydrated	
Dehydrated—Performance begins to drop	
Very Dehydrated	} See Health Care Provider/Dietician

*\*Note: Some foods, medication and supplements (B vitamins) can change urine color.*

**Dehydration can impair performance, especially in the heat, so stay hydrated!**

## How to Stay Hydrated!

When to drink...	How much to drink...
~4 hrs before tennis play	Drink ~16 to 20 oz.
~2 hrs before tennis play if urine is dark or in hot/humid conditions	Drink ~ 8– 12 oz.
10 to 15 min before tennis play	Drink ~ 8-12 oz.
During tennis play	Drink ~ 16-32 oz. per hr or according to sweat rate & urine color
After tennis play	Drink to replace sweat loss (24 oz./lb lost)
Through out the day	Drink regularly throughout the day.

American College of Sports Medicine Position Paper on Fluid Replacement during Exercise, 2007

**\*\* Plan on drinking between 100-135 oz. during days of tennis competition as a minimum base. Actual amounts differ based on body size, sex, sweat rates, etc.**

For individualized guidelines regarding fluid replacement and the use of water & sport drinks consult with your health care provider/sport dietitian.

Copyright © USTA. All Rights Reserved



# ***Best Practice: On Court Fluids***

## *Ideal Options:*

- Water
- Fitness Waters
- Sport Beverage (6-8% carbohydrate solution)

## *Non-Ideal Options:*

- Coconut Water – very high potassium, can average 500-700 mg caffeine
- High Carb Beverages – too high in carbs, more than 30 gms of carbohydrate
- High Carb Recovery Beverages – can cause stomach irritation
- Juices – too much fructose and acidity; can cause stomach upset
- Sodas – high sugar; carbonation can cause stomach irritation

# ***Lots of New Kids on the Block: What Should You Look for In a Sport Beverage***

- Contains electrolytes
- Contains at least 100 mg sodium per 8 oz
- Also contains chloride, and potassium
- And contains a 6-8% carbohydrate solution



# ***New Observations from National and International Events***

- ***Some players only drink water on court***
- ***More and more players are using gels/chew on court, but some are caffeinated***
- ***More and more players are artificially flavored beverages, low calorie beverages***
- ***Players mistakenly drink low sodium beverages on court***

# ***Training Diet Focus: Carbohydrates are Key to Help Hold Water in the Muscle***

## ***(3-4 gms/lb or 2-3 cups/meal)***

- Pasta
- Rice
- Potatoes
- Vegetables:  
peas, corn
- Beans:  
Legumes, lentils



- Breads and rolls
- Muffins and bagels
- Crackers and pretzels
- Hot and cold cereals
- Pancakes and waffles

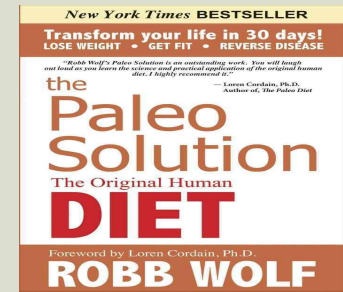
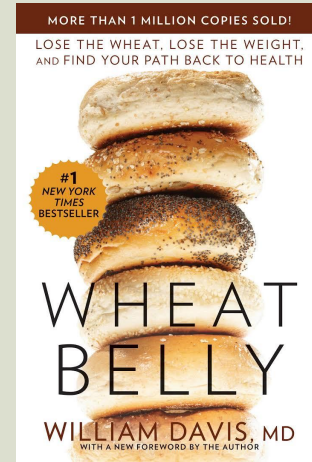
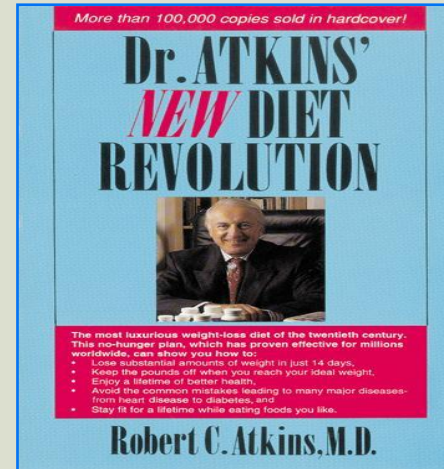
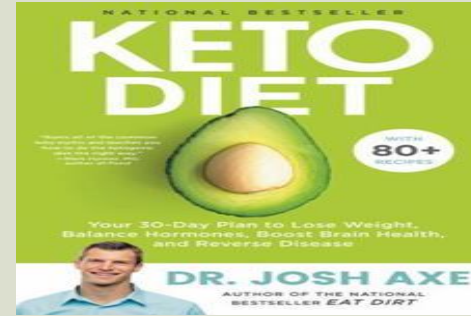
**If gluten free: choose rice, corn, potato based**

# Common Types of Diet Approaches Used by Competitive Players That Negatively Affect Hydration Status

1. *Low Carbohydrate*
2. *High Protein*
3. *High fat*

But, these can cause:

- *Muscle fatigue*
- *Increased water losses, diuretic side effects*
- *Inability to play at a higher intensity or make through practices*
- *Increased heat illness risk*



# ***Quick Fruits/Veggies – Drink Up for Water and Get Some Energy, Vitamins and Minerals Too!***



## ***Best Practice: Fuel Up for a Larger Pre-Play Breakfast***

- *Rehydrate and refuel from your overnight fast*
- *Start with a complex carbohydrate fiber*
- *Aim to take care of one dairy here!*
- *A great time to get your daily Vit C source in a fresh fruit*
- *A protein source may hold you for longer thru morning practice*



# *Key Snacks and Hydration Sources to Pack for Long Tournament Days*

- **Carbs** – bagels, bread, saltines, pretzels, rice cakes, raw veggies, dried fruit, bananas, oranges, apples, grapes
- **Proteins** – yogurt, string cheese, luncheon meat, tuna, PB, hard boiled eggs
- **Beverages** – water, sport beverages, juice, tomato juice, chocolate milk



# Cooler Cards from USTA Sport Science Committee

## Snacks

### Carbohydrates:

- ☐ Pretzels/crackers
- ☐ High carb Energy Bars
- ☐ Bagels/bread slices
- ☐ Popcorn
- ☐ Fig bars
- ☐ Granola bars/granola
- ☐ Graham crackers/Vanilla wafers
- ☐ Fresh Fruit/ Dried fruit
- ☐ Sliced vegetables (e.g. carrots, peppers )

### Proteins:

- ☐ String Cheese/ Cottage Cheese
- ☐ Tuna or Chicken salad kits
- ☐ Pudding
- ☐ Nuts
- ☐ Hummus dip
- ☐ Hard boiled eggs
- ☐ Luncheon meat

### Salt Sources:

- ☐ Pickles
- ☐ Broth soups/bouillon cubes

### Portable food sources:

- ☐ Peanut butter crackers
- ☐ Hummus and pretzels
- ☐ "Go Picnic" snack boxes
- ☐ Trail mix (nuts & dried fruit)

## Hydration

- ☐ Bottled water
- ☐ Sports Drinks
- ☐ 100% natural fruit Juice
- ☐ Low-fat chocolate milk
- ☐ Flavored seltzer waters
- ☐ Fruit/vegetable smoothies
- ☐ Tomato juice

### Before Practice/Match

16-20 oz. 2 hours before

### During Practice/Match

Four 8 oz. or Eight 16oz. depending on light or heavy sweating during change-over.

### After Practice/Match

One 24oz. bottle of sport drink per pound of body weight lost within a 2 hr. period.

6-8% carbohydrate content with electrolytes is the ideal sports drink.

\*Beverages containing caffeine, alcohol or carbonation are not effective for optimal hydration.

## Sports Foods

### 1 Hour Before Practice/Match

- ☐ Carbohydrate-rich, low-protein energy bar (e.g. original Power Bar or Clif Bar)

### During Practice/Match

- ☐ Energy Gels (caffeine-free)
- ☐ Sports jelly beans
- ☐ Pretzels

### After Practice/Match (within 30-45 min)

- ☐ Balanced protein drinks that contain no more than 30% of the calories from protein sources, such as Boost, Ensure, Gatorade Recovery, etc.
- ☐ Protein bar
- ☐ Low-fat Chocolate milk

### Other

- ☐
- ☐
- ☐



# ***Pre, During, and Post Match Eating/Hydration***

- **When to eat?**
  - **Ideally something every 3-4 hours**
  - **A meal 3-4 hours BEFORE matches**
  - **A carbohydrate snack 1 hour BEFORE matches**
  - **Carbohydrate/electrolyte fluid DURING practices or matches as tolerated; solid bland carbs on court if needed**
  - **Carbohydrate food/fluid within 15-20 minutes AFTER practice or matches, within 30- 45 minutes denser protein containing foods like recovery drinks or chocolate milk**



# ***What About Energy Drinks?***

1. Many energy drinks contain between 200mg - 300 mg caffeine, along with multiple other stimulant options not included in caffeine content
2. Be aware and try to avoid the following ingredient names that indicate stimulant side effects: caffeine or similar stimulants come in many forms: mahaung, guarana, kola mate, ginseng, taurine, theophylline, theobromine, and glucuronolactone.
3. Caffeine is an appetite suppressant, and may make it difficult to be hungry for pre and post workout fueling snacks. This may also suppress overall hunger, and can lead to less adequate fueling throughout the day.
4. High caffeine intake consumed within five hours of sleeping can disrupt sleep patterns. This may result in fatigue which can lead to muscle fatigue.
5. Caffeine-containing energy drinks can be dehydrating, especially the ones with 300mg or more caffeine. Or if drinking multiple energy drinks along with regular caffeine beverages during the day.

# ***Please Pass the Salt! Many Junior Tennis Players Need 5000mg+ per day***



# ***What are common sodium sources in the diet?***

- Table salt
- Salted crackers and pretzels
- Salted nuts
- Salty trail mix or snacks like Chex Mix
- Pickles or pickled vegetables
- Tomato juice, sauce, and salsa
- Soups and broths
- Dried meats like jerky



# ***Trends in Competitive Tennis Over Last Several Years with Hydration and Heat Management***

- *Improvement with on/off court hydration*
- *Increase in table salt use and higher sodium intake*
- *Monitoring of urine color*
- *Improved sport beverage use*
- *Protein recovery beverage has increased and with quicker time*
- *Changing clothes*
- *Ice Towel use*



***Thanks for your attention!***

**Questions?  
Contact Page at:  
[nutrifitga.com](http://nutrifitga.com)**

