

PERFORMANCE NUTRITION

~FIELD CLINIC 2016~




★ NUWANE E. KIRIHENNEDEGE, MS, RD, IOCDIP

SPORTS NUTRITION IN A NUT SHELL..

"A great diet cannot make an average athlete elite, but a poor diet can make an elite athlete average"

-Dr. David Costill

EXERCISE PERFORMANCE & NUTRITION



Strength, Power, Skills, Focus, Stamina, Hydration, Recovery, Building Muscle, Competition, Immunity, Speed

IT'S A TEAM EFFORT!



IF NUTRITION GONE WRONG...



- Get tired easily
- Can't keep up with workouts
- Less stamina
- Decreased motivation
- Loose focus and concentration
- Dehydration/over-hydration
- Heat illness/stroke
- Getting sick, catching cold/infection easily
- Stress fractures
- Muscle cramps
- GI issues (nausea, vomiting, diarrhea...)

NUTRITION PRIORITIES



- Training
- Competition
- Get Ready
- Get Better
- Heat Stress
- Fatigue

THE "CARBS"

Important to...


- Most efficient fuel source (Glycogen)
 - ↑ Intensity/duration = ↑ needs
- Muscles' fuel, the "gas"
 - Endurance
 - Speed
 - Power
- Brain's fuel
 - Mental alertness & Focus
 - Motivation
- Nerve cells, Red Blood Cells
- Glycogen storages are limited and must be replenished frequently → meals and snacks

No Carbs, No Gas!



CARBOHYDRATE SOURCES


- Bread
- Pasta
- Potato, yam, sweet potato
- Corn
- Rice
- Oats, barley, buckwheat...
- Beans and Legumes
- Fruits
- Dairy products
- Sports Products



PROTEINS

IMPORTANT FOR...

- Building muscles
 - Speed
 - Power
 - Endurance
- Muscle repair
- Immune cells
- Soft tissues, ligament tendons...




PROTEIN SOURCES

- MEAT & POULTRY
- GAME ANIMALS
- SEAFOOD
- EGGS
- DAIRY (MILK, YOGURT, KEFIR)
- SOY (TOFU, SOYMILK, EDAMAME, TEMPEH)
- BEANS AND LEGUMES
- NUTS & SEEDS
- QUINOA

VEGETARIAN ATHLETES

- COMPLETE PLANT PRO: SOY, QUINOA...
- PAIR PLANT BASE RIGHT!
 - GRAIN + LEGUME
 - BREAD + PB
 - RICE + BEANS
 - LEGUME + NUTS & SEEDS
 - HUMMUS (CHICK PEA + SESAME SEEDS)
 - LENTIL SOUP + PINE NUTS TOPPING

Plant based complete proteins:
<http://www.vegetarian.com/complete-proteins/>



FATS & LIPIDS


- Organ protection and insulation
- Carrying vitamins in the body
 - Vitamin A, D, E, K
- Essential fatty acids:
 - Maintenance of blood pressure, blood clots, immune function
- Anti-inflammatory (omega-3)
- Flavor of foods and satiation ☺

Energy source

- Low to moderate exercise intensity (esp. >90 min)
- Prolonged exercise when glycogen source becomes limited

Choose healthy Fats → Fish oil and plant oils

- Anti-inflammatory properties
- Anti-oxidant properties
- May affect recovery and immune function



FATS & LIPIDS: SOURCES

CHOOSE MORE OF THESE

- Olive oil
- Plant-base oils
- Nuts & Seeds
- Avocado
- Fatty fish
- Dairy foods
- Oil-based salad dressing

LESS OF THESE...

- Processed foods
 - Candy bars
 - Cookies, donuts, ect...
 - Chips
- Deep fried foods
- Fast foods
- Fatty meats & deli meats
- Shortening and Margarine
- Creamy salad dressing

VITAMINS & MINERALS



- Functions:
 - Immune functions
 - Anti-inflammatory
 - Bone/joint/tendon health
- Nutrients:
 - Antioxidants (colorful fruits & vegetables, the "rainbow")
 - Vitamin D (sun exposure, fatty fish, egg yolk, fortified product)
 - Calcium (dairy product, leafy green, broccoli, almond, fortified product)
 - Probiotics (yogurt, sauerkraut, kimchi, kombucha...)
 - Omega-3 fatty acids (cold water fish, nuts)

The bottom line...Eat Various FOOD & Colors!

1. OPTIMUM FUELING: ATHLETE'S PLATES



- | Easy | Moderate | Hard |
|--------------------------|--|--------------------------|
| 1 session/day* | 1-2 sessions / day** | ≥2 sessions/day |
| Technical/Skill-based tr | Technical/Skill-based tr | High volume intensity |
| Cross-training | Cross-training | Heavy Lifting |
| Weight Loss | 1 moderate to hard training w/ longer recovery | Altitude Training |
| Recovery Day | | Race or Trials |
| Off-Season | | Intense Training Periods |

EASY TRAINING / WEIGHT MANAGEMENT:

FATS
1 Teaspoon

Whole Grains
Pasta
Rice
Potatoes
Cornmeal
Breads
Legumes

Lean Protein
Poultry
Beef/Game/Lamb
Fish
Eggs
Low-Fat Dairy
Soy (e.g., Tofu, Tempeh)
Legumes/Nuts

Vegetables & Fruit
Raw Veggies
Cooked Veggies
Veggie Soups
Fresh Fruit

FLAVORS
Salt/Pepper
Herbs
Spices
Vinegar
Salsas
Mustard
Ketchup

Beverages
Water
Dairy/Nondairy
Beverages
Diluted Juice
Flavored Beverages
Coffee
Tea

Other items: Avocado, Oils, Nuts, Seeds, Cheese, Butter

EXAMPLES: EASY PLATE

- **BREAKFASTS (1-2 HRS BEFORE)**
 - YOGURT PARFAT
 - PLAIN GREEK YOGURT
 - FRESH SEASONAL FRUIT
 - GRANOLA / SPRINKLES
 - VEGGIE OMELET
 - EGGS
 - SPINACH
 - CHEESE
 - OLIVE OIL
 - CRISPY RYE BREAD
- **LUNCHES (2-3 HRS BEFORE)**
 - ATHLETE SALAD
 - DARK GREENS
 - SEASONAL VEGGIES
 - FRESH FRUIT/DRIED FRUIT
 - BLACK BEANS
 - GRILLED FISH OR CHICKEN
 - OLIVE OIL, BALSAMIC
 - OPEN FACED TURKEY OR HUMMUS SANDWICH
 - SEASONAL VEGGIES ON SIDE
 - FRESH FRUIT & NUTS

Timing 1-3 hrs **EXERCISE**

MODERATE TRAINING:

FATS
1 Tablespoon

Grains
Pasta
Rice
Potatoes
Cornmeal
Breads
Legumes

Lean Protein
Poultry
Beef/Game/Lamb
Fish
Eggs
Low-Fat Dairy
Soy (e.g., Tofu, Tempeh)
Legumes/Nuts

Vegetables & Fruit
Raw Veggies
Cooked Veggies
Veggie Soups
Fresh Fruit
Stewed Fruit
Dried Fruit

FLAVORS
Salt/Pepper
Herbs
Spices
Vinegar
Salsas
Mustard
Ketchup

Beverages
Water
Dairy/Nondairy
Beverages
Diluted Juice
Flavored Beverages
Coffee
Tea

Other items: Avocado, Oils, Nuts, Seeds, Cheese, Butter

EXAMPLES: MODERATE PLATE

- **BREAKFASTS (1-2 HRS BEFORE)**
 - COLD CEREAL
 - WHOLE GRAIN CEREAL
 - SEASONAL FRUIT OR BERRIES
 - MILK
 - GREEK YOGURT
 - SCRAMBLED EGGS
 - EGGS
 - SPINACH & TOMATOES
 - CHEESE
 - OLIVE OIL
 - WHOLE GRAIN TOAST
- **LUNCHES (2-3 HRS BEFORE)**
 - SANDWICH BOX
 - WHOLE GRAIN SANDWICH W/ TURKEY/MUSTARD, CUCUMBER, CRANBERRY
 - CARROTS
 - FRESH FRUIT
 - GRANOLA BAR
 - STIR FRY LEFT-OVER
 - CHICKEN STIR FRY
 - VEGGIES
 - BROWN RICE
 - FRESH SEASONAL FRUIT

Timing 1-3 hrs **EXERCISE**

HARD TRAINING / RACE DAY:

EXAMPLES: HARD PLATE

- BREAKFASTS (1-2 HRS BEFORE)**
 - OATMEAL & EGGS
 - OATMEAL COOKED IN MILK/SOY MILK
 - APPLE SAUCE
 - HONEY
 - TOAST W/ EGGS AND SALSA
 - OATMEAL PANCAKES
 - PANCAKES W/ OATS
 - BANANAS
 - SYRUP, BUTTER
 - SMOOTHIE W/ FROZEN BERRIES
- LUNCHES (2-3 HRS BEFORE)**
 - SANDWICH BOX
 - LIGHT WHEAT BRD., TURKEY, MUSHRM
 - LETTUCE/TOMATO
 - BBQ/ESTRONE
 - APPLE SAUCE
 - HONEY GRAHAMS
 - PASTA BOWL
 - WHITE, AL-DENTE PASTA
 - SAUTÉED CARROTS ZUCCHINI
 - PAN SEARED WHITEFISH, CHICKEN OR TURKEY
 - APPLE SAUCE

Timing **13 hrs** **EXERCISE**

2. TIMING

EASY TRAINING

- 1 session/day
- Moderate to hard training
- Cross-training
- Weight loss
- Recovery/off season

MODERATE TRAINING

- 1-2 sessions/day
- Moderate to hard training
- 1 cross-training session
- 1 moderate to hard training with longer recovery

HARD TRAINING

- 2 or more sessions/day
- High-intensity training
- Heavy lifting
- Multiple training
- Race or trials
- Intense training periods

FUELING SNACKS & STRATEGIES

Before/PREPARE!

- Sport bar
- Bread/jam
- Oatmeal
- Banana

During/OPTIMIZE!

- Sport drink
- Gels
- Blots
- Sport bar
- Breads, rice balls

Post/RECOVER!

- Sport bar
- Smoothie
- Flavored milk
- Recovery Mix

COMPETITION DAY: "PREPARE"

- Priority:**
 - Fuel muscle power
 - Optimize hydration status
 - Prevent hunger
 - Prevent feeling "sluggish"
 - ↓ GI issues
 - Foods related to psychology or superstitions
 - Plan around meet schedule
 - can be in the field for a long time...pack snack!
- Why?**
 - Get muscle and brain power!!!
 - Concentration, delay fatigue
 - Focus
 - Feeling good and comfortable

COMPETITION-DAY NUTRITION

3-4 hrs	1-2 hrs	< 1 hr
Adequate CHO Mod-low PRO Low Fat Manage fiber Hydration	Adequate CHO Mod-low PRO Low Fat Manage fiber Hydration	As needed... Adequate CHO Hydration
Meals: oatmeal + honey + dried fruits, milk, toasts + eggs, apple sauce	Light meals or snacks: smoothies, yogurt+ granola + fruits	Sports drink, sports bar, fruits...

Planning ahead for a long day! Schedule meals & bring snacks

2. RECOVERY



- Get ready for the next training
- Get better over time
- Recover (what's lost), not over-fuel!
- Why?
 - Optimize training adaptation
 - ↑ muscle mass
 - Reduce fatigue
 - Restore performance level
- Recovery nutrition depends on:
 - ✓ Type of training session
 - ✓ Training volume & intensity
 - ✓ Timing of next training
- Part of the total nutrition plan and individual goals

4 R's IN RECOVERY NUTRITION

- **REFUEL (CHO)**
MUSCLE & LIVER GLYCOGEN STORES
- **REHYDRATE (FLUID)**
FLUID & ELECTROLYTES LOSS
- **REBUILD (PROTEIN)**
PROTEIN SYNTHESIS FOR REPAIR & ADAPTATION
- **REINFORCE (ANTIOXIDANTS)**
SUPPORT IMMUNE FXN, OXIDATIVE TISSUE DAMAGE



NOW WHAT?

- Recovery snacks
 - Timing important (post training)!
 - What's in it?
 - Carbohydrate
 - Protein
 - Low-fat
 - Fluid

Recovery snacks

- Yogurt + granola
- Cottage cheese + fruit
- Chocolate milk
- Smoothie (yogurt fruit milk)
- Cereal + milk
- Jerky + pretzels
- PB&J + milk
- Protein bar + water
- Protein shake



3. HYDRATION

- Priority:
 - Optimize hydration to prevent de-over-hydration and negative impact on exercise performance
 - Better control body temperature to prevent heat injuries (and cold)
- Good hydration is important for:
 - Brain function
 - Transporting nutrients in & waste products out
 - Carrying oxygen
 - Digestive process and tract
 - Muscles and joints
 - Heart function & kidney function
 - Regulating body temperature



DEHYDRATION

- Effects on body
 - ↑ Body Temp
 - ↑ Risk of heat stroke
 - Early fatigue Alter Immune function
 - Interfere Muscle endurance and strength
 - Alertness (may ↑ injuries)
 - Urinary tract infection (UTI)



- Young athletes may be ↑ risk for heat injuries in environments that are...
 - Hot
 - Humid
- Athletes with SCI may have:
 - decreased sweating ability → other cooling techniques
 - Harder time controlling body temperature in hot & cold environment

OVER-HYDRATION

- Exercise associated hyponatremia
 - Drinking too much water
 - Dilution of blood sodium level
 - Upsets water balance in body
 - Brain swelling
 - Can be very dangerous
 - Avoid weight gain during exercise



OPTIMAL HYDRATION: DAY-TO-DAY

Strategies

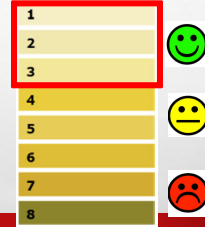
- Include fluids with meals
- Drink fluids before and after training
- Drink fluid during training if longer session
- Carry a water bottle daily
- Hydration status can be monitored with urine color

Fluid Sources

- Water
- Tea/coffee
- Milk, soy/nut milk
- Fruit juice
 - Cranberry juice (UTI)
- Smoothies
- Sports drinks
- Juicy fresh fruits
- Soups/broth

During high intensity, long training → Use sports drinks

KNOW HOW HYDRATED YOU ARE!



HYDRATION GUIDELINES

Pre

- Goal: Start exercise with good hydration status
- 4 hrs before: 5-7mL/kg BW
- 2 hrs before (if dark/urine): additional 3-5 mL/kg BW

During

- Goal: Avoid excess dehydration or fluid intake
- Minimize body weight loss $\leq 2\%$ (esp. aerobic, warm environment)
- Avoid weight gain (over hydration)

Post

- Goal: Replenish fluid deficit and electrolyte loss
- Drink 16-24 oz/lb BW lost (or 2-3 cups fluid/lb)
- Sodium from beverage or snacks can help fluid retention

COOLING TECHNIQUES

- WATER SPRAY
- ICE/WATER BATH (HANDS/FEET)
- LOCALIZED COOLING:
 - EX. COLD TOWEL AROUND NECK OR HEAD
- BEING IN SHADES
- HYDRATION
 - COOL FLUIDS
 - ICE SLURRY/SLUSHY



RESOURCES

- NUTRITION - TEAM USA
- FACT SHEET & RESOURCES
 - ATHLETES PLATES
 - FACT SHEETS
 - RECIPES
- @NUTR4TEAMUSA
- NUTR4TEAMUSA

