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Timing is Everything

Melissa Layne, Med

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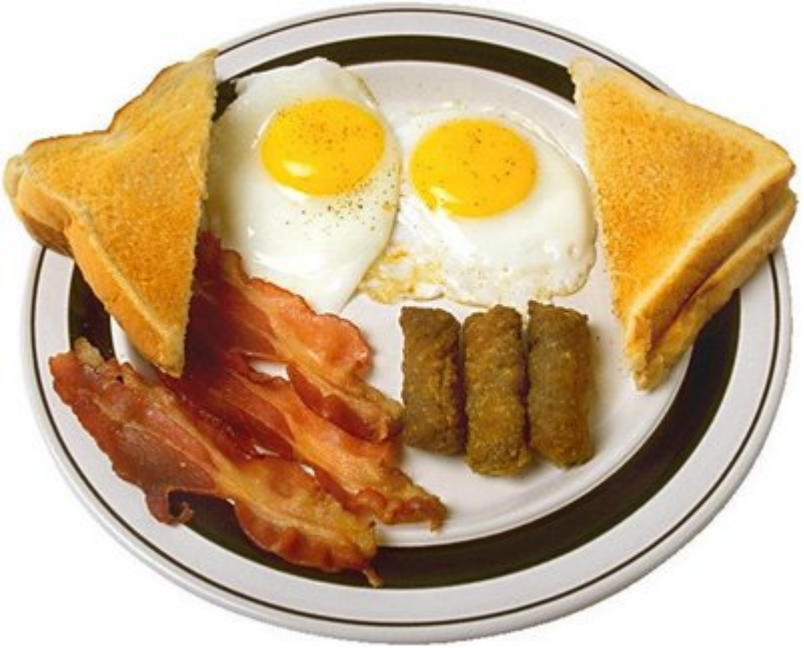
- Exercise-nutrient intake timing is critical in determining physiological results. The influence of differing macronutrients affects outcomes, and with the popularity of carb cycling and carb fasting, fitness professionals need to understand the physiology behind these concepts. This session encompasses all the timing aspects of front and back loading and what current research shows about carb cycling and fasting for weight loss, muscle gain and while cutting. (LECTURE)

Myths

- You can’t exercise on an empty stomach.
  - The body will compensate with other energy options if you do.
  - Gluconeogenesis being the dominate one.
- You need to eat complex carbs before you workout.
  - Ketogenic diets lower performance.
  - Ketogenic diets take three to four weeks to see results.
  - Floods of FFA cannot be efficiently converted to acetyl CoA so ketones appear in increased amounts
- You need to eat carbs immediately after your workout.
  - To increase your glycogen stores so that your next performance is GREAT
  - But what if weight loss is your goal?
  - Your EPOC will now be fueled mainly by ketones and gluconeogenesis
  - While it is believed that carb intake after exercise is the best way to replace glycogen, studies have shown that after an adaptation period of 2-4 weeks, physical endurance (not intensity) is unaffected by ketosis

Myths



- You need breakfast to break the fast
  - Fasting is fasting no matter when it occurs
  - Hunters and gatherers rarely ate breakfast.
  - 90% of the population eats breakfast
    - 67% of the population is overweight or obese
- Eating raises your metabolism
  - Eating has a thermic effect of food (TEF) and dependent on which macronutrient you eat, your body increases metabolism to break down that food
  - But it doesn't continue indefinitely and you don't burn all the calories you eat
  - Net effect is the same whether you eat three or six times (it's a percentage of calories)
  - It has also been studied that eating more often with smaller portions doesn't satisfy everyone. Larger meals seem to cause a larger feeling of satiety.

Ketosis

- Most cells can use both glucose and ketone bodies for fuel.
- Longer term ketosis may result from fasting, staying on a low carb diet or as a treatment for epilepsy.
- In glycolysis, higher levels of insulin promote storage of body fat and block release of FFA from adipose.
- While in ketosis, fat reserves are readily available , released and consumed.
- Beginning, blood glucose levels are maintained from gluconeogenesis because the adult brain does not burn ketones.
- After about 48 hours, ketones are burnt to save glucose and avoid depletion of muscle protein.

Bottom Line

- What is your ultimate goal?
- What is your periodization goal?
- What is your daily goal?

Research

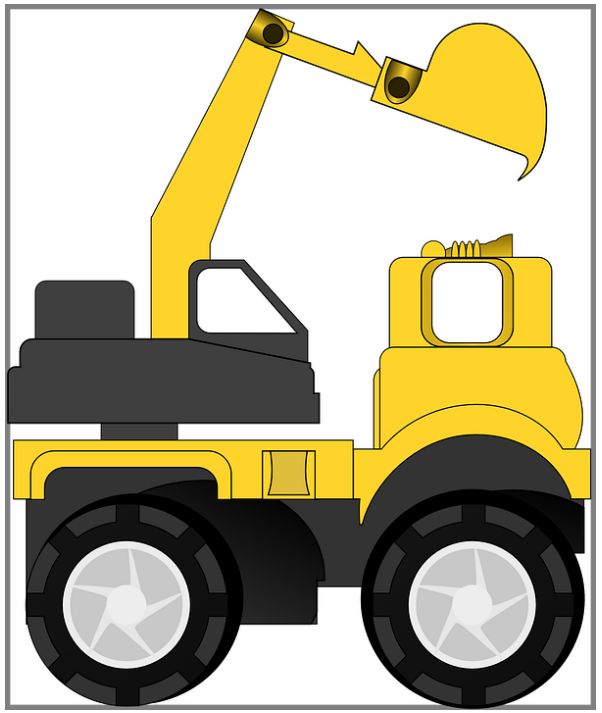
- Animal research has shown that intermittent fasting and calorie restriction may increase the life span by creating a stressor to adjust.
- In a fasted state an uptake in genes (PDKL and HSL) indicated an increase in the use of stored fuel to fuel metabolism.
  - Same genes decreased with eating before an endurance event
- Fasting only 25% of one day (6 hours) showed no change in the metabolic reactions of the body.
- One low carb day decreases insulin resistance increasing insulin cell sensitivity.
- A diet of 80% simple carbs and 20% SAFA created arthritic knees and a smaller hippocampus in just two weeks
- Sugar substitutes don’t help our weight loss attempts;
  - Aspartame actually blocks the intestinal enzyme that keeps us from getting fat
  - Sucralose increases fat production and inflammation

Preloading or Front Loading

- Food intake before exercise is dependent on when you ate last especially if you are exercising first thing in the morning
- Popular protocol
  - 0.5 grams of carb per pound of body weight one hour before moderately hard exercise
  - Studies show athletes who ate 400 calories of carbs biked 25% longer than those who drank water
  - Foods that contain a bit of protein will prevent the body from utilizing protein as an energy source

Back Loading

- As soon as tolerable – preferable within a 30 minute window
  - 0.5 gram of carbs per pound of body weight every hour
  - Foods containing protein will prevent gluconeogenesis
  - Taken for 30 minutes intervals for four to five hours
  - Or until a meal can be eaten



Carb Cycling

- Used by body builders, fitness competitors and certain athletes fro decades
- Stimulates certain digestive and metabolic functions through hormonal activity or inactivity
- Eating enough carbs at the right time resets the thermostat and allows you to create leptin and thyroid hormones
- Some diet plans have “no carb days” cycled in
- More carbs on certain days and extremely low on the other
  - Most build in one to three days of heavy carbs
  - Dependent on goals
  - Unprocessed carbs

Numbers

- Women usually stick within the 1500-2300 calorie range throughout the week while men range 1500-3000
- Easiest to sustain if you add or decrease only about 400-600 calories between high-carb and low-carb days
- Higher carb-days might include 200-300 grams of carbs while low are 75-150 grams (never below 50)

Benefits over “Dieting”

- Preserving muscle mass
  - Protein intake does not fluctuate
- Helping muscle recovery
- Reducing body fat percentage
  - Creates a fat-burning effect without entering ketosis
- Prevents a metabolic dip
- Includes flexibility of foods
  - Helps you stick with the plan – little feelings of deprivation
- Encourages you to eat more plant foods
  - Fiber fills you up
- Prevents extreme hunger helps prevent hormone imbalances
  - Insulin
  - Glucagon
  - Leptin
  - Ghrelin
  - TSH

The High Carb Day

- Increase your carb and protein intake while decreasing fat
- Best used around the toughest training days
- Men – multiply weight (lbs) times 1.7 for carbs and protein and 0.6 for fat, multiply by the Atwater number
- Women – multiply weight (lbs) times 1.4 for carbs and protein and 0.6 for fat and multiply times the Atwater number

Low Carb Day

- Men – protein is weight times 1.5 grams times Atwater number
  - Carbs are 0.9 grams times weight times Atwater number
  - Fat is 0.8 grams times weight times Atwater number
- Women – protein is weight times 1.2 grams times Atwater number
  - Carbs are 0.6 grams times weight times Atwater number
  - Fat is 0.5 grams times weight times Atwater number

No Carb Day

- Simplest, yet most physically and mentally challenging day
- Only carbs you get are from the greens you are eating
- Some people tolerate low carbs and no carb days better than others
- Only you will be able to discern if you are going too low

Most Common Approach

- Place higher carbohydrate days on heaviest training days
- Place lower carb days on low intensity training days
- Usually based on eating six times per day
- You must know your RMR and your Harris Benedict number as well as your ultimate goal to assure adequate protein intake, as well as fat and carb percentages

Diet Comparisons

- Atkins diet is a high protein low carb – water loss is quick, hard to sustain, lack of fiber causes digestive problems, protein is used as energy source if carbs are absent
- Keto diet is a very low carb diet (50-75 grams per day), put into ketosis, causes the carb flu (fatigue and irritability – hangry.)
- Carb cycling is three or four days of low carbs (75-150 grams per day)

Tips for Sticking With It

- Need changes minimal, a few at a time.
- Incorporate strength training
- Maintain 1500 calories minimally
- Eat nutrient-dense foods
- Avoid drinking your calories
- Get enough sleep and manage stress

Precautions

- Feeling more fatigued than usual
- Carving carbs at times
- Constipation
- Feeling weaker during workouts
- having trouble sleeping
- Being moody or irritable

Intermittent Fasting

- Beneficial effects for reducing insulin, triglycerides and blood glucose
- Recommendations vary on what can be consumed during fasting periods (tea, coffee, artificial sweeteners?)
- Two types
  - Whole day fasting involves regular one day fasts
    - Alternate day fasting (ADF) – 24 hours fasting (500-600 calories) followed by 24 hours nonfasting
  - Time-restricted feeding (TRF) involves eating only during a certain number of hours each day.
    - Fasting for 16 hours, eating for 8
    - Fasting for 12 hours, eating for 12 hours
    - Eating one meal per day and fasting for 23 hours

Research

- Studied since the 1930s
- Reducing calories helped mice live longer
- More recent studies showed the same with fruit flies, round worms and monkeys
- Decreasing calorie consumption by 30-40% can extend a life span by a third
- May increase the body's responsiveness to insulin, hormone optimization
  - Increased growth hormone secretion
- Teaches the difference between stomach hunger and head hunger
- UK study of the 5:2 diet in 2012

5 Methods

- Leangains
  - Fast 14 for women, 16 hours for men; maintain a constant regular feeding schedule; sleep for 8 of the 14 or 16 and go into the morning in a fasting state
  - Coffee, tea and artificial sweeteners are allowed
  - Break the fast roughly 6 hours after waking
  - Macro percentages are based on type of workout
- Eat Stop Eat
  - Fast for 24 hours once or twice a week; start gradually and gradually reduce caloric intake
  - Think of it as “taking a break from food”
  - Eat real food and plan on a caloric restriction
- Warrior Plan
  - Fast for 20 hours each day and eat a large meal at night; can have raw fruit or vegetables during day; inherently programmed as “nocturnal eaters” in sync with the Circadian rhythm
- Fat Loss Plan
  - Combines all of the above, giving you a cheat day (Sunday)
  - On 630 calories for each of the 3 meals on eating days, Tuesday through Saturday
  - Fast day may be 24 or 36 hours (Monday)
- Alternate Day Fasting (ADF)
  - Eat very little one day and eat normally the next (1/5th), down day should be 400-500 calories total
  - Work out on normal caloric days
  - Extremely hard to stick with

Hormones

- Insulin
  - Anabolic hormone produced in the pancreas, traveling to all muscle cells to help with the storage of glucose as glycerol in the muscle tissue
  - The receptor cells on the muscle cell wall are more sensitive after a catabolic event such as a workout or a fasting period (anything that depletes glycogen)
- Growth hormone
  - Fasting causes an increase as often seen with higher levels in the early morning sleep hours
  - Is believed to offset the effects of cortisol which increases body fat
  - Increases the rate of hypertrophy

Tips for Getting Started

- Drink plenty of water
- Fast overnight
- Rewire your thought processes to “taking a break” instead of deprivation
- Hit the gym moderately
- Start with short fasting windows and gradually increase

Training Strategy

- Train low
  - Prompts helpful metabolic changes such as increased FFA availability
- Train high
  - Less fatigue
  - Better intestinal function
- Train the gut
  - Leads to adaptations that improve nutrient delivery and reduce GI sensitivity
- Train with race day nutrition
  - What works well through proven performance

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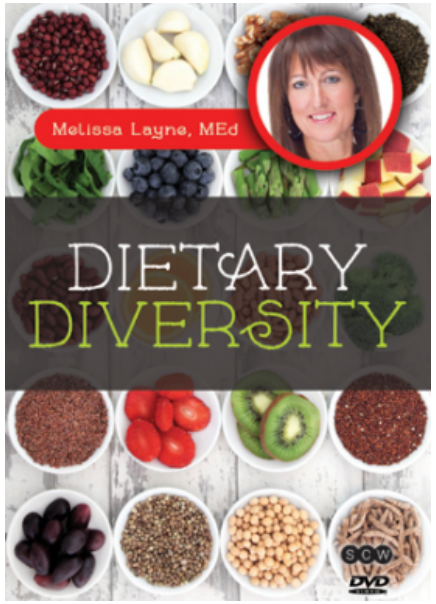
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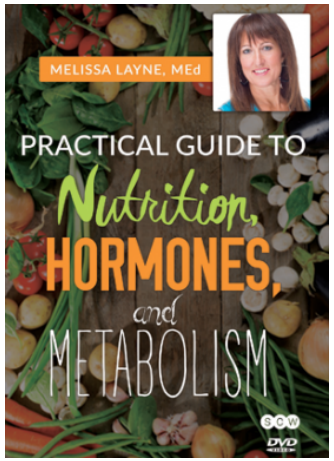
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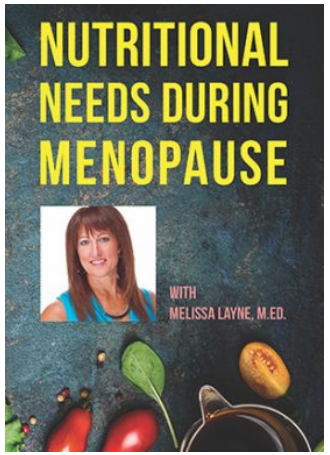
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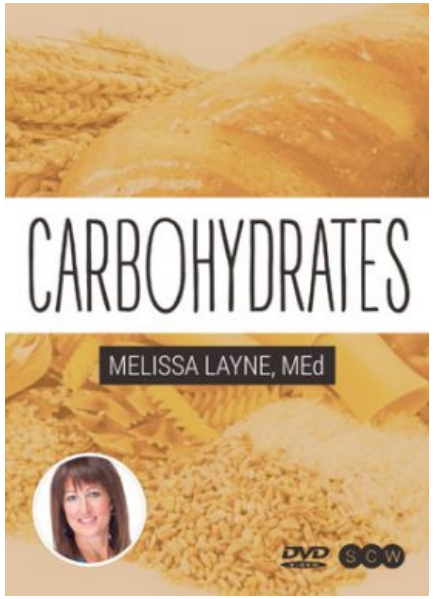
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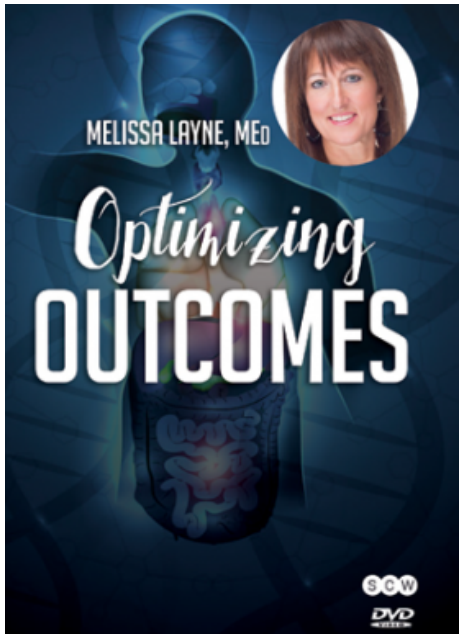
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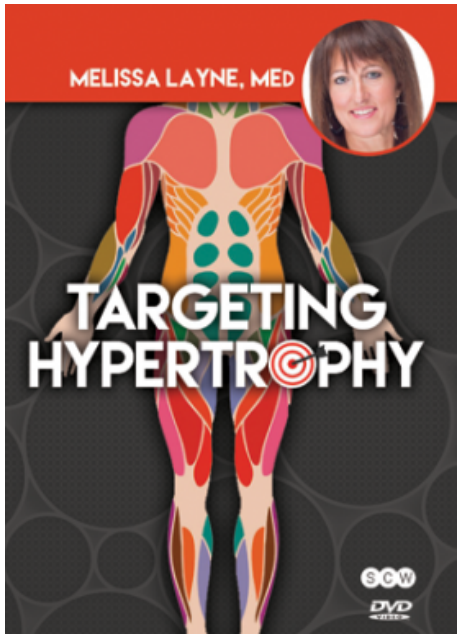
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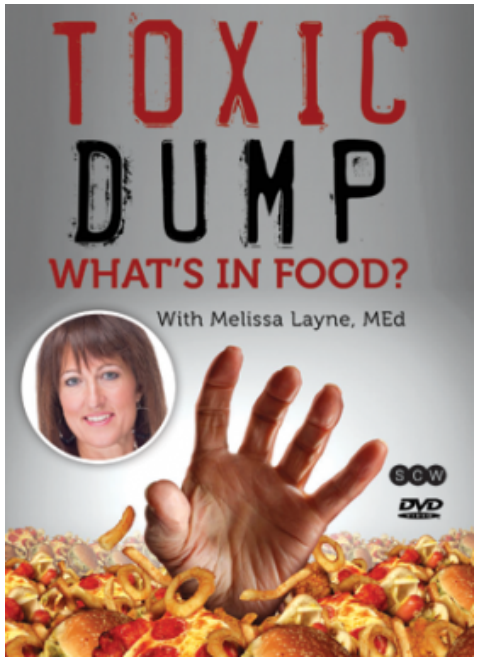
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