

Intermittent Fasting, Carb Cycling and Weight Management

Brent Agin, MD

Presenter

Brent Agin, MD

CEO/ Founder:

- Trim[®] Nutrition, Inc.
- MyPracticeConnect[™] - Electronic Prescribing Platform & Physician Training
- TeleWellnessMD[™]
- Teaza[®] Energy

Medical Director:

- Metabolix Wellness Center- Clearwater, FL
- Novus Medical Detox



State of our Health

- If you're like more than 70% of Americans, you're currently overweight or obese
- If you're like most of the population you are taking more medications than vitamins
- If you're like 70% of us, you get no exercise
- If you're like 66% of us, you are on a diet at all times and still manage to be overweight or obese
- If you are like 30 million Americans you have diabetes

State of our Health

- Diagnosis of chronic disease is on the rise
- Diagnosis of psychiatric illness is at all time high
- Diagnosis of autoimmune disease is increasing
- Substance abuse is at all time high

State of our Health

Overweight and obesity are associated with:

- Circadian Rhythm disorder
- Hormone imbalance
- Gastrointestinal disorders
- Chronic inflammation
- Autoimmune disease
- Top 5 cancers
- Cardiovascular disease
- Diabetes
- Psychiatric disease

Obesity is an EPIDEMIC

- Despite pharmaceutical companies spending billions to find the “magic pill”
- Hundreds of weight loss programs and franchises
- Most obese females over the age of 40 are life time members of Jenny Craig or Weight Watchers
- A growing billion dollar weight loss supplement industry
- Most overweight individuals could design a successful weight loss plan

How Do We Treat Obesity

- Obesity is now classified as a disease
- Social pressure has created a movement to accept being overweight and obese as “normal”
- Medical providers are facing a major challenge in convincing overweight patients that they have a serious disease
- Despite these challenges weight management continues to be a rewarding area of medicine
- With diet alone we can change peoples lives

**“Let food be thy medicine
and medicine be thy food.”**

Hippocrates

The Five Pillars of Health

- Sleep
- Diet
- Exercise
- Nutritional Supplementation
- Hormone Optimization

The Top 3 - Lifestyle Drives Wellness

- Sleep, diet and exercise are lifestyle opportunities
- Patients have to be the biggest advocates of their own health and wellness
- Adjuvant therapies will help, but must have the top three in place

Supporting Therapies

- Hormone optimization
- Peptide therapies
- Intravenous and injectable nutrient therapies
- Ketogenic eating programs: periodic fasting, intermittent fasting and low carbohydrate diets
- Carbohydrate back loading and cycling
- Nutrient supplementation

Keys to Success

Remove the dieting out of weight loss

- Improve your energy
- Improve your mood
- Prevent disease
- Lower healthcare costs
- Pull your own weight challenge
- You are your biggest asset
- Lifestyle is the most important factor – it's FREE

How to Beat Weight Loss Statistics

Keys to Success

- Consider the 5 pillars of health – top 3 key
- Offer rather than just weight loss
- Supported by science
- Direct health benefits
- Nutritionally balanced
- Must include exercise
- Simple to sustain

Goal:

To feel the best you can both mentally and physically – weight loss will follow

Necessary Components

- Science provides confidence
- Must include all macronutrients
- Exercise driven with realistic exercise options
- Improve health quickly – not just cosmetic
- Has to be more than a diet – must become a way of life

Common Failures

- Eliminating fats and carbohydrates is not the answer
- Very low calorie diets are not healthy
- Point systems are not sustainable
- Exercise is often left out and sometimes discouraged
- Focus is on weight loss - not achieving optimal health and wellness
- Cannot eliminate carbohydrates but need to control them

Important Terms

- **Glycolysis:** The process in cell metabolism by which carbohydrates and sugars, especially glucose, are broken down producing ATP and pyruvic acid.
- **Gluconeogenesis:** formation of glucose within the body from precursors other than carbohydrates especially by the liver and kidney using amino acids from proteins, glycerol from fats
- **Glucagon:** secreted by the pancreas and does the opposite of insulin. Prevents blood glucose from dropping too low
- **Fatty Acid Oxidation:** A series of reactions cleave off two carbon atoms at a time from the hydrocarbon chain of the **fatty acid**. These two-carbon fragments are combined with coenzyme A to form acetyl coenzyme A (acetyl CoA), which then enters the Krebs cycle and eventually making ATP.
- **Ketosis:** a metabolic state characterized by raised levels of ketone bodies in the body tissues

Key Hormones

- **Adiponectin:** a protein that is involved in regulating glucose levels and burning fat. Low levels of Adiponectin are associated with higher levels of obesity.
- **Leptin:** the “Starvation Hormone” is a protein produced by fatty tissue that notifies your brain that you have eaten enough and your calorie intake is sufficient.
- **Ghrelin:** known as the “Hunger Hormone”, has direct effects on hunger and therefore the ability for people to lose weight and maintain weight loss. Ghrelin does more than just increase food intake, it can also increase fat mass.
- **Insulin:** hormone produced in the pancreas that regulates the amount of glucose in the blood.
- **Cortisol:** the stress hormone binds to fat cells and can increase the number of fat cells but also promotes the storage of fat.
- **Growth Hormone:** active metabolic hormone released from pituitary

Key Nutrients

- **Macronutrients** are those nutrients that the body needs in large amounts to provide the body with calories or energy. The macronutrients are carbohydrates, fat and protein.
- **Micronutrients** as opposed to macronutrients (protein, carbohydrates and fat), are comprised of vitamins and minerals which are required in small quantities to ensure normal metabolism, growth and physical well-being.

Macronutrients

- **Carbohydrates-** Cause insulin release
 - Insulin is the gate keeper to the body's cells
 - Converted to adenosine triphosphate (ATP) for immediate energy
 - Stored as glycogen
 - Stored as triglycerides
- **Fats-** broken down into fatty acids
 - Fatty acids not used as fuel right away are stored in fat cells in cell's mitochondria through a process called beta-oxidation and used as fuel
- **Proteins-** broken down into amino acids and used in body's cells to build new muscle
 - Excess amino acids are then converted by the liver into keto acids and urea
 - Keto acids may be used as sources of energy, converted into glucose, or stored as fat
 - Urea is excreted in sweat and urine

Science

- Ketosis
- Fasting – Focus on intermittent fasting
- Healthy Fats
- Carbohydrate Cycling or Back-loading
- Exercise

Science #1

Ketosis

Ketosis: A metabolic process that occurs when the body does not have enough dietary carbohydrates (glucose) for energy so it turns to your stored fat for fuel.

Ketosis

- Can achieve ketosis from very low carb diet or fasting
- After a meal as blood sugar normalizes and glycogen stores are depleted
- Low blood sugar = low insulin levels = increase glucagon and fat oxidation
- Once this occurs, fatty acids enter the bloodstream and taken up by cells
- Once in the cells, fatty acids are transported into the mitochondria via beta-oxidation.
- Beta-oxidation increases the amounts of a molecule called Acetyl-CoA
- Acetyl-CoA is shunted to ketogenesis producing ketone bodies that can be used for energy.

Ketosis

- Ketosis is a normal process during fasting or with low carbohydrate intake
- The body actually prefers ketones over glucose.
- The body has plenty of stored fat for fuel
- Burning fat for fuel is more efficient for cells

Ketosis

- Lower insulin levels causes greater fat breakdown (lipolysis)
- Normal diet insulin levels are much higher
- Low insulin stimulates key hormone release
- Is powerful natural appetite suppressant

Ketosis

- Studies show, diets that promote ketosis support fat reduction, prevent obesity and provide beneficial disease-modifying effects
- Efficient fat loss while maximizing antioxidant and anti-inflammatory actions
- Fat loss is gradual but effective for long term success

Ketosis

- Normalizes defective cellular energy production in the brain and body
- Neurological conditions are linked to low energy production
- Ketogenic diets provides two primary energy sources:
 - Glucose from glycogen stores in the liver
 - Gluconeogenesis, which forms glucose from non-carbohydrate sources and ketone bodies, synthesized from fatty acids in the liver

Ketosis & Muscles

- Muscles need to have glycogen stores replenished to help support muscle building
- Glycogen (stored sugar) is the key to get the body to burn fat and also spare protein to build muscle
- It's important to remember that carbohydrates are an important nutrient for the body and removing essential carbohydrates results in:
 - deficiencies of key nutrients
 - shifts the body's innate fat burning mechanisms
- Especially noticeable for those trying to maintain an aggressive exercise regimen while dieting
- **Solution**: eat the right carbs, in the right quantities, at the right times

Continuous Ketosis

- Continuous low-carb diets = yo-yo dieting
 - Not a consistent, healthy lifestyle
- Low-carb alone is not optimal for maintaining muscle mass when done continuously, especially when performing calorie restriction at the same time

Ketones

- Ketone bodies are an efficient fuel for the body and brain
- Beta-Hydroxybutyrate (β -HB) provides more energy than glucose
- Better mitochondria function

Ketones

- Improved mood and cognitive function are common findings from ketosis due to increased β -HB levels and/or decreased glucose levels
- β -HB has a similar makeup to γ -hydroxybutyrate (GHB)
- Reduced brain glucose promotes neurogenesis (growth and development of nerve cells)

Ketosis Health Benefits

- Extremely powerful for disease and age management
- Can replace ineffective pharmacological therapies
- Growing appeal of natural therapies
- Ketosis is most notable and effective dietary treatment for neurological conditions
- The two major health opportunities from ketosis are:
 - Rise in ketone body production by the liver
 - Reduction in blood glucose levels

Science # 2

Intermittent Fasting (IF)

- Not truly a diet
- Strategic meal scheduling
- Facilitates ketosis
- Can avoid the “keto” flu
- Controls eating
- Allows for easy carbohydrate management
- “Bullet” coffee breakfast

Intermittent Fasting

- Creating a period of no food for 12-16 hours
- Easy: Time from your last meal at night until your first meal the next day.
- The fasting period
 - Can start with 12 hours
 - Goal is 16 hours
- Ex: Eat last meal 10 p.m. Next meal at 10 a.m., for a 12-hour fasting period

Intermittent Fasting

- Use fat as a fuel - fatty acid oxidation
- Old theory: high-carbohydrate breakfast
 - Causes insulin and glucose levels to spike
 - Shuts off fat-burning for several hours
 - Drives unused calories into fat stores
 - Triggers hunger by spikes of insulin and glucose
- Goal: Ketosis as result of low carbohydrates and fasting

Intermittent Fasting: Hormone Support

- **Insulin** – Low in fasted state while glucagon and growth hormone are elevated.
- **Human Growth Hormone** –Increases growth hormone levels
- **Leptin** –Regulates leptin the “satiety hormone”.
- **Ghrelin** –Normalize ghrelin, the “hunger hormone” by acting as a natural appetite suppressant.
- **Cortisol** –plays a large role in fat burning, naturally highest in the morning.
- **Testosterone** –Increases luteinizing hormone (LH)

Intermittent Fasting Benefits

- Improves energy
- Rapid shift into ketosis
- Decreases body fat
- Improves insulin sensitivity
- Stimulates hormone production and balance
- Promotes nerve repair & regeneration
- Supports a healthy lean body mass.
- Decreases low-density lipoprotein (LDL)
- Reduces oxidative stress and inflammation
- Lowers risk of heart disease, diabetes, cancer, and aging
- Cell clean up (autophagy) initiating stem cell activity

Science #3

Healthy Fats

- Fat is calorically dense with 9 calories per gram
- More concentrated source of energy than protein and carbs - 4 g
- Consuming sufficient amounts of healthy fats in the right form is essential for:
 - Immune system and reduction of inflammation
 - Cellular repair
 - Brain function
 - Increase energy and performance
 - Key in regulating body weight
 - Needed to absorb several antioxidants, fat-soluble vitamins A, D, E and K
 - Aids in the formation of hormones

Healthy Fats

- Bad fats - Trans fats (trans fatty acids)
 - Abundant in foods that contain vegetable oil
 - Associated with heart disease and diabetes, especially when also consuming high carbohydrate diet
- Healthy fats
 - Some saturated fats
 - Unsaturated fats: polyunsaturated and monounsaturated
 - lower cholesterol levels and reduce your risk of heart disease.
 - Polyunsaturated fats (omega-3 fatty acids)
 - fish, walnuts, almonds, and flaxseed
 - Monounsaturated fats- such as avocados
 - Most of an avocado's calories are in the form of fiber and healthy fat

Medium Chain Triglycerides (MCT)

- Coconut oil- healthy saturated fat made up mostly of medium-chain triglycerides (MCT)
 - Better than longer chain fats found in vegetable oils and fatty meats
 - Go straight to the liver, where they are turned into ketone bodies and provide a quick source of energy
- Works good with intermittent fasting

Saturated Fat

- Studies show that saturated fats do not increase risks for heart disease
 - Increase good cholesterol (HDL) levels.
 - Saturated fats can raise LDL (large fluffy LDL)
- Elevated small dense LDL particles accompanied by high triglycerides are a result of high-carb, low-fat diets
- Check lipid particle analysis prior to starting

Science #4

Carb Cycling

Carb cycling: the practice of consuming varying quantities of carbohydrates at specific days and times

Carb Cycling

- Must have carbohydrates in the diet
- Carb reload days refills important glycogen stores
- Controlled carbohydrate intake can lead to accelerated metabolic state while preserving lean muscle mass
- Fat is lost safely and effectively
- Often cycling is timed around physical exercise
- Cycling = control

Carb Cycling

Carb Cycling:

- Low carb days
- Carb reload nights
- Detox phase and low carb days = increase insulin sensitivity & fat oxidation
- Carb reload nights:
 - replenish glucose and glycogen stores
 - manipulate insulin to push nutrients into muscle
 - fat burning
 - Long term success
- Carb reload nights 5-8 p.m. consume carbohydrates of your choice
- Enjoy foods you have sacrificed and remember it will not sacrifice your results

Science #5

Exercise

- Any activity that is more intense than normal daily physical activities and can improve health and wellness.
- Exercise is not the same as being active

Exercise

- Exercise is a major component of metabolism
- Important component of long term weight loss
- Strengthens bones and muscles
- Supports mental health
- Decreases risk of chronic disease, especially heart
- Exercise options
 - Aerobic exercise
 - Anaerobic exercise
- High Intensity Interval Training (HIIT)
 - Exercise that combines both aerobic and anaerobic

HIIT
Resistance
Training

Exercise for Fat Loss Hierarchy



Exercise & Carbohydrates

Carbs aid muscle growth and exercise performance in several ways

- **Promote recovery:** Carbs may help with recovery after exercise.
- **Produce insulin:** Carbs stimulate insulin production, which helps with nutrient delivery and sugar absorption.
- **Provide fuel:** Carbs play an important role in energy production, which are a primary fuel sources for high-intensity exercise.
- **Reduce muscle breakdown:** Carbs help reduce muscle breakdown through glucose storing in the form of glycogen

Resistance
Training

HIIT

Benefits of High Intensity Interval Training

- Maximizes both aerobic and anaerobic energy
- Focus on building and sustaining lean muscle
- Maximum fat burning
- Improves metabolism
- Time sensitive – 30 minutes or less 3-6 days a week
- No equipment needed and can be done from home
- Multiple exercises
- Can be done outside
- Low risk of injury

Summary

Goal: To feel the best you can both mentally and physically

Success:

- Science supported
- Includes all macronutrients
- Exercise driven
- Less focused on weight loss more on health
- Must be easily incorporated into lifestyle

Benefits

- Reduction in weight and increase in fat loss
- Reduction in blood triglycerides
- Reduction in blood pressure through vasodilation
- Reduction in markers of inflammation (including CRP, IL-6, TNF)
- Reduction in migraines
- Reduction in oxidative stress
- Reduction in risk of cancer
- Increase in cellular turnover and repair (autophagy)
- Increased growth hormone release
- Improved metabolism

Benefits

- Natural appetite suppression through Ghrelin and Leptin effects
- Improved insulin sensitivity
- Improved muscle building
- Improved cognition and fine motor skills
- Improved hormone balance
- Improved neurotransmitter production
- Reduced inflammation
- Increased nerve generation and protection (neurogenesis)
- Improvement in behavior associated with autism and spectrum disorders
- Modifies disease progression in Epilepsy, Parkinson's, Multiple Sclerosis, and autoimmune disease

Supporting Cast

- Sleep
- Nutritional Supplementation
- Hormone Optimization

Sleep

- Important for hormone production and secretion
- Necessary for rest and recovery
- Circadian Rhythm disorder can limit success

Hormones

- Being overweight and obese directly produces hormone imbalances
- Adipose tissue acts as an endocrine gland
- Optimizing hormones improves the other four pillars
- Ignoring hormone imbalance will limit success and can result in weight loss failures

Nutritional Supplements

- Supplements to requirements
- Nobody gets the right amount of fruits and vegetables
- Supplements are quick, easy and calculated
- Protein, fiber and micronutrients

Summary

- Remember the 5 pillars
 - Sleep
 - Diet
 - Exercise
 - Nutritional Supplementation
 - Hormone Optimization
- This is lifestyle medicine – weight comes with it
- Use Science to your benefit
- Don't give up

Followers of Intermittent Fasting & Carb Cycling

Jamie Tripp, ARNP -33
mother of two

Brent Agin, MD -47



References

- Veech, Richard L. "The Therapeutic Implications of Ketone Bodies: the Effects of Ketone Bodies in Pathological Conditions: Ketosis, Ketogenic Diet, Redox States, Insulin Resistance, and Mitochondrial Metabolism." *Prostaglandins, Leukotrienes and Essential Fatty Acids* 70, vol. 70, 2004, pp. 309–319.
- Moro, T, et al. "Effects of Eight Weeks of Time Restricted Feeding (16/8) on Basal Metabolism, Maximal Strength, Body Composition, Inflammation, and Cardiovascular Risk Factors in Resistance Trained Males." *Journal of Translational Medicine*, vol. 14, 2016, p. 290.
- Mattson, M, et al. "Impact of Intermittent Fasting on Health and Disease Processes." *Ageing Research Reviews*, vol. 39, 2017, pp. 46–58.

Thank You