You hear the expression weak adrenals thrown around a lot if you’re in the health and fitness community or reading books, blogs and listening to podcasts on health-related topics. It’s very common that we, as everyday Americans and athletes/CrossFitters even more so, experience varying levels of restful sleep, energy, digestive function, immunity and the ability to recover from exercise.
Adrenal Fatigue, we have a close relationship with the condition of adrenal fatigue as we all have suffered from it at varying levels.
Simple Truths of Exhaustion:

1. People who train hard and look lean are not always healthy.
2. Eating fat will not make you fat.
3. Working out smarter, not harder is often the way to achieve performance and aesthetic goals.
4. Sleep is the cornerstone of being able to eat well, train well and to allow the body to re-set stress levels and lose body fat.

What is stress?

Stress is a specific response by the body to a stimulus, such as fear or pain that disturbs or interferes with normal physiological equilibrium. Stress can be physical, mental or emotional strain or tension and can be an occurrence (chronic or acute) or a causative factor in a state of dis-ease. Key players in the endocrine game of stress & adrenal function:
Adrenal glands:

Two, triangular shaped glands that sit on top of your kidneys, consisting of an inner medulla and an outer cortex. The adrenal medulla produces and secretes epinephrine (adrenaline, a fast-acting hormone), norepinephrine (noradrenaline), and a small amount of dopamine in response to stimulation by sympathetic preganglionic neurons. The adrenal cortex mediates the stress response through the production of steroid hormones: mineralocorticoids and glucocorticoids, including aldosterone and cortisol respectively as well as DHEA and sex hormone precursors.
Cortisol:

The hormone released in response to any kind of systemic stress. Its primary functions are to increase blood sugar through gluconeogenesis; suppress the immune system; and aid in fat, protein and carbohydrate metabolism.

**Hormones, neurotransmitters, cytokines (immune system signals), lipopolysaccharides (waste/endotoxins from bacterial infections/gram-negative bacteria)**

**Hypothalamus-Pituitary-Adrenal Axis (HPA Axis):**

The system of communication between the neuro-endocrine glands that dictates our responses to stress as well as our circadian rhythm.

**Neurotransmitters, Excitatory & Inhibitory:**

Neurotransmitters are chemical messengers that transmit signals from neurons to their target cells across synapses. The way each neurotransmitter is classified is based upon which receptors they activate. Some typically excitatory neurotransmitters include glutamate, dopamine, acetylcholine, epinephrine (adrenaline), norepinephrine (noradrenaline) and histamine. Some typically inhibitory neurotransmitters include serotonin (95% of which is made in the gut, according to Elizabeth Lipski), GABA, glycine and adenosine.
Hippocampus & Circadian Rhythm:

The gland that regulates circadian rhythm, our bodies’ roughly 24-hour cycle in biochemical, physiological, and behavioral processes. When the neuro-endocrine pathways are well-balanced... In a perfect world, we wouldn’t have extreme imbalances in this system of messages at all. We might experience acute bouts of an imbalance, but we’d quickly come back to a homeostasis and appropriate cortisol levels and rhythm throughout the day (high in the morning, tapering off to low in the evening). In balance, we have adequate amounts of serotonin in a healthy gut to promote the production of melatonin at night – the counter regulatory hormone to cortisol that manages our sleep cycle while cortisol manages our wake cycle. When we are able to fall asleep at night easily, wake up in the morning easily and feeling
rested and have good energy throughout the daytime, we are in good balance. When stress takes over, that’s when the balance is lost.

**How stress affects your system.**

The diagram below illustrates a stress response we might have that we are aware of, such as a traffic jam when we’re on our way to an important meeting. It’s important to note that similar stressors can affect different people in different ways depending on the constitution of the person as well as that person’s state of mental, emotional and physical well-being at the time the stressor is introduced. For example, two people may be in the same traffic jam, but one is perfectly happy to sit and listen to his Paleo Solution Podcast for an extra 20 minutes, while the other is about to be late for an important job interview. The chain of events that happens in reaction to the traffic jam in each person’s system will be very different as a result. Additionally, this response can be happening on a systemic level on a daily basis if you are eating food that you don’t tolerate – your weekly gluten-bomb cheats that you think aren’t so bad... they are. and your body is trying to recover from the inflammation in your gut without reprieve.
There are many different ways people deal with Confrontation

Stressful Situation:
The Ultra Rich try to Control You and Your Family

Fight
Say Something, Stand behind those who fight for you

Flight
Change the topic, Look elsewhere Pretend everything is OK

Freeze
Like a Deer in the Headlights
Some people freeze when they hear conflict or anger, They are sensitive to Loud Noises, They are easily made into slaves and servants because they would rather be a slave than hear loud noises or confront people
Two reasons why conventional medical treatment for Hypoadrenia (adrenal fatigue) is so hard to find is:

1. Money: there are no patentable treatments for hypoadrenia produced by the pharmaceutical companies. (no money to be made).

2. Politics: Since the 1970s, the FDA has "outlawed" and actively persecuted one of the chief natural remedies for hypoadrenia, an extremely safe remedy called adrenal cortical extract (ACE).

(The FDA removed all products containing adrenal cortical extract from market in 1978 due to concerns regarding contamination.)

People with adrenal fatigue often look and act relatively normal.

They often use coffee, colas, sugar and other stimulants to get going in the morning and to prop themselves up during the day.

They may appear to be lazy and unmotivated, or to have lost their ambition, when in reality quite the opposite is true.
“Hypoadrenia”: The Adrenal Problem that most conventionally trained physicians don’t know about.

- Non-Addison’s hypoadrenia
- Subclinical hypoadrenia
- Neurasthenia
- Adrenal neurasthenia
- Adrenal apathy
- Adrenal fatigue
- “Adrenal burnout”
- “Chronic fatigue syndrome”?!!

Modern medicine does not recognize it.

HOLISTIC
Psychology | Philosophy
Behavior | Cognition

Diet | Nutrition | Vitamins | Minerals
Acupuncture | Oriental Herbs
DNA | Metabolism | Constituionals
Homotoxicology | Homeopathy
Massage | Electro-Stress
Naturopathy | Chiropractic

ENERGETIC MEDICINE
Eductor SCIO Nelson +
A repeatedly excitatory response to this kind of stressor, or even a chronic internal stress such as malnutrition or gut irritation/leaky gut, can push your immuno-endocrine system completely off balance. It should become apparent just how critical our nutrition, proper doses of exercise, gut health, thoughts, emotions, perceptions and reactions to life stressors really are when we’re talking about keeping the messages being sent to our adrenal glands in check.

**A Look at the Problem: It’s Not Your Adrenal Glands’ Fault**

The single biggest contributing factor to adrenal fatigue (or an altered adrenal profile, as I like to call it) is stress. It sounds simple enough, but the reality is that stress comes in so many varieties and forms that it’s impossible to avoid all together. What we must do is identify the forms that we can best control in our lives and work on making diet and lifestyle modifications to work on lowering the stress-load on our systems. We can also work on finding better ways to help our bodies to manage the stressors that we do experience that we cannot eliminate.

Contributors to the stress that leads to adrenal fatigue can be lifestyle stressors including but not limited to: lack of sleep, poor food choices, use of stimulants, pulling “all-nighters” or “pushing through” a day despite being tired, perfectionism, staying in no-win situations for too long, over training, lack of fun or stress-relieving practices. Those who are: students, medical professionals, single parents, unhappily married, unhappy or unsatisfied at work, are self-employed or starting a new business, abuse drugs or alcohol, have alternating shift schedules or who are the “all work and no play” types have lifestyles that lead to adrenal fatigue. Furthermore, life events that can lead to adrenal fatigue include: unrelieved pressure or stress at work, any crisis or severe emotional trauma, death of a loved one, major surgery, extended or chronic illness, sudden change in life situations such as loss of a job or moving without much friend or family support in a new location and repeated or extended chemical exposure.

(Wilson, 17-18) The problem of stress might not be such an issue if we weren’t compounding many stressors over the course of days, weeks, months and years without much downtime for
our systems. So, while the condition of adrenal fatigue can come on suddenly as triggered by a traumatic or severe life event, most commonly it is experienced after a gradual, cumulative effect of multiple stressors.

**If the adrenal glands ability to make cortisol is not to blame, then what is?**

If a person has completed an Adrenal Salivary Index (sometimes called and Adrenal Stress Index or ASI) test and there is output of cortisol over the course of the day that is not simply low at each measured time, then the adrenals are capable of producing cortisol, they are just “off” in how they are releasing it in response to the messages they receive from the Hypothalamus-Pituitary-Adrenal Axis (HPA Axis). It’s pretty uncommon to see a test result that’s simply low across the board, typically there’s at least one spike in a person’s levels. So, what does that mean? The adrenals are doing what they’re asked to do by the higher order functions of our bodies, but that may not be the desired action in terms of a healthy volume and balance for our cortisol throughout the day.

This brings us back to the HPA Axis and our good friend, Balance.

The way we can bring our adrenal health back in line is to balance out the types of messages our Hypothalamus is sending to our adrenal glands via the HPA Axis. Imagine this action is a bit like a teeter totter...
Symptoms of an Altered Adrenal Profile

1. fatigue
2. inability to recover appropriately from exercise (you should feel tired post-workout for MAYBE 20-30 minutes, then you should feel just fine – if you are dragging for hours or the rest of the day, you overdid it!)
3. headaches with physical or mental stress
4. weak immune system & allergies
5. slow to start in the morning
6. gastric ulcers
7. afternoon headaches
8. feeling full or bloated
9. craving sweets, caffeine or cigarettes
10. blurred vision
11. unstable behavior
12. becoming shaky or light-headed if meals are missed or delayed
13. cannot stay asleep or cannot fall asleep
14. dizziness when moving from sitting to standing or lying to standing
15. transient spells of dizziness
16. asthma, allergies
17. hemorrhoids, varicose veins

Exam Findings of Adrenal Stress

- Ragland’s Sign – postural hypotension when BP drops 4-10 mm Hg when moving from supine to standing
- Arroyo’s sign – pupil dilates or fluctuates in size within 40 seconds of shining a light into it
- Rogoff’s Sign – tenderness at the ends of the 11th and 12th ribs
- Heart auscultation reveals increased S2
- Bloodwork – decreased Na
Ragland's Blood Pressure (hydrostatic)
Hypo-Adrenaia Test


2. Ask the patient to stand up and quickly take the B/P again. A drop of more than 10 points on the Systolic Pressure means Hypoadrenia, 20 or more drop extreme Hypoadrenia

Rogoff's sign= Back pain over the Adrenals

Adrenal Gland
kidney
Body Temperature Test for Thyroid and Adrenal

You can determine your thyroid and adrenal status by following Dr. Rind with a temperature graph—doing your Daily Average Temps. You simply take your temp 3 times a day, starting three hours after you wake up, and every three hours after that, to equal three temps. *(If you have eaten or exercised right before it’s time to take your temp, wait 20 more minutes.)* Then average them for that day. Do this for AT LEAST 5 days. If your averaged temp is fluctuating from day to day more than .2 to .3 *(with a lean towards .2)*, you need adrenal support. Again, your daily average temps should lean towards the .2 when on enough cortisol for your needs. *Summary from Dr. Rind:* If your temps are fluctuating but overall low, you need more adrenal support and thyroid. If your temps are fluctuating...
but averaging 98.6, you just need adrenal support. If it is steady but low, you need more thyroid and adrenals are likely fine. (We note that mercury thermometers are the most accurate.)

For those already on cortisol, the above temperature test (comparing at LEAST 5 days of averages) is ideal to know if you are on enough cortisol for you needs. In other words, if any daily averaged temps are more than .2-.3 from another day’s temp, you are not on enough cortisol, patients have learned (most of those daily averages should be .2 from each other). Overshooting your cortisol supplementation can also cause this instability.

***Women: if you are still menstruating, it’s best to do your Daily Average Temps started at the end of your period i.e. away from your mid-cycle or ovulation.

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It is often possible to assess adrenal insufficiency based upon symptoms. Anyone who is tired, allergic, intolerant to cold, with symptoms of low blood sugar such as craving sweets or starches, or who is weak, or has low blood pressure most likely has some degree of adrenal insufficiency.

**Blood tests.** These are variable and are often absolutely normal. However, it is possible that the serum sodium level is less than 130 mEq/L and a serum potassium greater than 5 mEq/L. A low glucose levels and elevated blood urea nitrogen (BUN) may also be present. Other factors, however, can affect the serum readings.

A blood test for adrenal function involves measuring 17-ketosteroids, a breakdown product of the adrenal hormones. Measuring the ketosteroids alone is not considered accurate. To perform the test properly, an injection of ACTH (adreno-cortical stimulating hormone) is given first. Then urine is collected and measured for 17-hydroxycorticosteroids (17-OHCS) and 17-ketogenic steroids (17-KGS).
Measurement of 17-OHCS and 17-KGS without the ACTH loading is not useful and may be misleading. The loading dose of ACTH measures how well the adrenals respond to the pituitary. Many people with adrenal insufficiency have no symptoms if the adrenals are not called upon to respond to a stressor.

**Hair mineral analysis** is an excellent assessment tool for adrenal insufficiency when the test is properly performed. It is often much more significant, reliable and sensitive than blood or most other tests provided the test is done correctly and one knows how to interpret it. The hair must not be washed at the laboratory. Washing the hair at the laboratory erratically removes sodium and potassium, critical minerals for adrenal assessment. According to the research of Dr. Paul Eck, the following are indicators of adrenal insufficiency on a hair analysis:

* Sodium level less than 25 mg%
* Potassium level less than 10 mg%
* Sodium/potassium ratio less than 2.5:1
* Sodium/magnesium ratio less than 4.17:1
* Calcium/potassium ratio greater than 10:1

Only one indicator need be present for the pattern to be likely. The more of these indicators that are present, the greater the evidence of adrenal insufficiency. Also, the more
extreme the values, the more suggestive of adrenal insufficiency problems.

**Quantifying adrenal insufficiency and adrenal burnout.** Each of the following criteria adds a multiple to the burnout pattern. For example, if two of the following indicators are present, I call it double burnout. The hair must not be washed at the laboratory for any of these criteria to be valid.

1. Slow oxidation
2. Very slow oxidation, with a calcium/potassium ratio greater than about 200 (ideal is about 4).
3. A calcium shell may overlap with very slow oxidation, but may be a separate burnout indicator.
4. A sodium/potassium ratio less than about 2. If the sodium/potassium ratio is very low, this adds more multiples (see A Low Sodium/potassium Ratio below for those criteria).
5. A sodium level less than about 11 mg%.
6. A potassium level less than about 5 mg%.
7. Three lows, also called three low macrominerals.
8. Four lows, also called four low macrominerals. This is a double burnout pattern.
9. Phosphorus less than 12 mg%. Phosphorus less than 10 may be a double burnout indicator.

11. *Poor eliminator pattern*, with at least three very low metal readings, is a burnout indicator. Six poor eliminator indicators is a double burnout indicator. The minerals to look for are copper, iron, manganese, lead, mercury, cadmium, arsenic, aluminum and nickel.

When more than one of these indicators are revealed, one refers to the situation as double burnout, triple burnout or perhaps quadruple or quintuple burnout.

**What can you do about it?**

**Lifestyle:**

SLEEP!

Avoid draining people or situations. Learn to say NO to things!

Do not over-train: (training vs draining, working out vs working IN, READ: Paul Chek’s book “How to Eat, Move and Be Healthy” for more on this)
Do restorative exercises: see Paul Chek’s book – listed above – Qigong, meditation, restorative breathing, walking, very light/restorative yoga. Depending on your status, if you are going to lift weights, keep it moderate weight and low reps- not high intensity over long periods of time.

**ADRENAL MASSAGE:** A light massage of the adrenals can stimulate adrenalin by bringing blood flow to the adrenals
Slight rotation counter clockwise helps to stimulate adrenalin 2 to 5 min
Do not use excess pressure
twice a day if necessary 5 hours in between

**Whenever you are not enjoying your life, assess whether you can:**

1. Change the situation
2. Change yourself to fit the situation
3. Leave the situation
4. Face the situation through acceptance and logically adapting to the situation
5. Keep a gratitude list.
6. Play! With family, friends, pets.
Diet: *(Read IMUNE Adrenal diet book)*

A variety of organic vegetables and fruit

EFAs (omega 3 fatty acids) to manage inflammation and quiet the loop that feeds into higher cortisol production

Add mineral sea salt to food / water

Balanced meals – judge your “success” by how you feel entering your next meal (starving, shaky, low blood sugar?!)  

**Supplements & Nutrients in your food on which to focus:**

1. Vitamin C – Citrus, strawberries, kiwi, cruciferous vegetables and green leafy vegetables are good food sources. This potent antioxidant has been shown to induce an anti-inflammatory response to prolonged exercise and stress and mitigates the rise of cortisol and subjective response to physiological stress in human studies. Generally a high-dose supplementation is recommended short-term and to bowel-tolerance. *(Life Extension, 17)*

2. Vitamin B5 Pantothenic Acid (or only a complex as noted below) – Helps to activate the adrenal glands and deficiency results in adrenal insufficiencies characterized by “fatigue, headaches, sleep disturbances, nausea and abdominal discomfort.” *(Life Extension, 17)*

3. Vitamin B Complex – Liver, meat, seafood (wild/pasture raised, grass-fed sources), seeds, mushrooms are good food sources. All B vitamins are critical for the entire adrenal cascade – lower your dosage with recovery and focus only on foods. *(Bauman, 2010) (Wilson, 199)*
4. B 15 methyl donor pangamic acid to promote oxygen release

5. Magnesium Glycinate or Malate – Green leafy vegetables, pumpkin seeds, sesame seeds (also tahihi) salmon and halibut are good food sources. Magnesium is “essential to the production of the enzymes and the energy necessary for the adrenal cascade.

6. Omega 3 – Fatty cold water fish: salmon, mackerel, herring, some tunas, etc. are good food sources. In supplemental form, fermented cod liver oil from GreenPasture.org is the one that I recommend.

**Herbal Support:**

1. Licorice root extract (DGL) – no more than 1000mg of glycyrrhizin/day – when cortisol is lower than normal rhythm or output should be. (Life Extension, 17) This is also easily taken via licorice root tea before 3pm.

2. Acetylcholine – To support poor circadian rhythm function (tired & wired/can’t sleep), supporting brain and neurotransmitter function. (Walsh, T-nation)

3. L-theanine – As a calming amino acid, works by increasing GABA which is a relaxer and creates a sense of well-being in the brain. (Life Extension, 16)

4. Seriphos (Phosphorylated Serine) at bedtime. Short-term to re-regulate sleep cycles.

5. Ashwaganda root & leaf, Panax ginseng, Siberian ginseng, Ginger root – adaptogenic herbs that can help to modulate cortisol levels, normalize blood pressure, heart rate and increase metabolic rate by stimulating the production of digestive enzymes for protein and fat.

6. Ginkgo biloba – a powerful antioxidant that helps to calm free-radical production and thereby protect the adrenals from the imbalance of inputs to the hypothalamus that the free-radical damage would create. (Wilson, 193-207)
If you are curious about your own adrenal health status...

Contact a naturopath, chiropractor, certified nutrition consultant or other practitioner in your area to find out if they can run an adrenal salivary index test for you.

Sources:

T-Nation.com, “The Truth About Adrenal Fatigue,” Bryan Walsh


Adrenal fatigue creeps into our lives via so many different avenues. Stress, over-work, trauma, lack of sleep, major life changes, surgeries, infections, autoimmune disease, over-training, blood sugar fluctuations (these stress the adrenals), vegetarian/vegan diets (high in copper/low in zinc, as well as high in carbs that can cause blood sugar swings), Leaky Gut Syndrome, pregnancy... the list of contributing factors just goes on and on.
We always hear about stress-induced high cortisol, which does all kinds of not-fun things like increasing belly fat and killing brain cells! But what happens when you've cranked out the stress hormones for so long that you've exhausted your adrenals? You start experiencing hormone cascade disruption in the form of "pregenolone steal":

What happens is that, instead of converting pregenolone into DHEA and then into sex hormones, it gets shifted toward cortisol production (cortisol is more vital to our existence than sex hormones are and so it gets prioritized. Cortisol is a major steroid hormone and too little of it really drives up inflammation).

There are 4 stages of adrenal fatigue:

Stage 1: Alarm Response/Fight-or-Flight (Increase in cortisol is still within the body's output capacity).

Stage 2: Resistance Response/chronic stress (The adrenals are not able to keep up with cortisol demand. Fatigue is present. Ability to handle stress is decreased. Sleep disruption occurs. Thyroid hormone conversion is affected.)


Stage 4: Adrenal crash/failure
So, what are the symptoms of adrenal fatigue? Could I have it?

Morning fatigue/morning headache.

Not really feeling awake until around 10 a.m.

Afternoon “low” (feelings of sleepiness or clouded thinking) from 2 to 4 p.m.

A burst of energy at 6 p.m. when you finally feel better from your afternoon lull

Sleepiness around 9 p.m. to 10 p.m. However, you resist going to sleep

A “second wind” at 11 p.m. that lasts until about 1 a.m.

Never feeling rested, no matter how much sleep you get

Cravings for foods high in salt and fats

Increased thirst/frequent urination (water goes right through you)

Chronic low blood pressure

Sensitivity to cold and feeling chilled

Increased PMS or menopausal symptoms

Mild depression

Mood swings

Mental fog

Memory problems

A decreased ability to handle stress

A decreased ability to recover from illness/injury

Heat intolerance

Light-headedness when getting up from a sitting or lying down position
Decreased sex drive

Frequent sighing

Inability to handle foods high in potassium or carbohydrates unless they’re combined with fats and protein

Sugar cravings

Leaky Gut Syndrome

Increased food/seasonal allergies

Increased sensitivity to sunlight

Low progesterone/DHEA and possibly estrogen

Hot flashes

General inflammation

Achiness or joint pain

Poor exercise recovery

Difficulty losing weight/belly fat

Difficulty in changing body composition/hard gainer

Muscular weakness

Purple or blue under-eye circles

Vertical lines in the fingertips

Ringing in the ears

Heart palpitations or tachycardia

Thyroid hormone (T3) conversion impairment
NOTE: Many conventional doctors do not recognize adrenal fatigue as a medical condition, nor utilize saliva hormone panels. They are trained to only recognize full-blown Addison's Disease. If your doctor falls into this category, you’re going to have to find another practitioner to help you.

Once you know that you have adrenal fatigue, you have to be willing to commit to lifestyle changes in order to heal. If you have mild adrenal fatigue, you can recover quickly with the right tools and changes. If it's more severe, realistically it will take a minimum of several months and it's highly recommended to seek the care of a good practitioner (someone who practices Functional Medicine/Functional Endocrinology or even a skilled acupuncturist/OMD). There may be underlying factors that need addressing that are beyond your ability to identify or address.

Be aware that for more advanced adrenal fatigue, the healing process is not a linear one. You might start to feel good and then feel not so great again for a little while. Be patient!

Some helpful things for healing adrenal fatigue:

-SLEEP! As much as possible, get 9+ hours. Yes, this is a lot, but you need that much to heal. Don't make the mistake I did by skimping on sleep!

-Get to bed early! Getting to bed before 10 is preferable. You want to go to sleep in that window of sleepiness before your second wind hits. That second wind is a surge of cortisol (not good!) and will work against your progress.

-Eat a diet (preferably Paleo/Primal!) that's easy on your blood sugar. Eat lots of protein and fat and to avoid blood sugar fluctuations and eat carbs like sweet potatoes or berries that are easier on your blood sugar. The cold, hard truth (that I learned the cold, hard way) is that it's a
lot harder to heal adrenal fatigue on vegetarian/vegan diets (as per Dr. James Wilson, one of the most experienced in his field).

- Don't exercise too hard. You'll only set back your progress. Learn to gauge what you can actually handle. If you can't recover quickly or feel worse the next day, it's too much. I recommend sticking to short walks, gentle yoga and esp. tai chi or qigong (qigong really helped my healing!) Now is not the time to be trying to get buff (you won't be able get buff anyway until your cortisol/sex hormone levels are healthy!)

- Add 1/4-1/2 tsp. unrefined salt (any salt with color like Redmond Real Salt or Pink Himalayan) to your water. This sounds odd, but when you're in a state of pregnenolone steal, you're not making much aldosterone (see the chart), the hormone that regulates sodium/potassium levels and the balance of these minerals is upset, causing sodium loss, which is made worse by drinking large amounts of water, which further dilutes blood sodium levels (hence the low blood pressure/dizziness upon standing/muscle weakness/heat intolerance.) The salt will quickly correct those symptoms.

- Be kind and patient with yourself. Give yourself permission to not get stuff done if it's not immediately pressing. Let go of perfectionism. Get help from others when possible.

- To help with mental stress, try L-Theanine. Theanine is an amino acid found in green tea and it helps the brain make alpha waves, which will put you into a calmer, more focused state. 100-400 mgs at a time is the dose. It can be a sanity saver!

- Deep breathing. Such a fundamental thing, but most of us don't even know HOW to breathe properly! Get yourself into the habit of doing a few minutes of deep breathing upon waking, before meals and before bed. I promise you will feel a difference!
Anatomy of Stress

**The Stressor-Response Begins:**
- Amygdala — sounds an all-systems alert based on the biological (survival) value of the stressor (the salience, significance, novelty, unpredictability, and ambiguity) and thereby modulates other anatomical components involved in our response. It also stores a memory of the event.

**Behind The Scenes:**
- Brain — Hypothalamic-pituitary-adrenal (HPA) — axis readies you for action (fight or flight)
- Glucose and oxygen flood into heart, brain, and skeletal muscles and away from non-vital organs
- Blood becomes thicker and stickier so that if wounded you don’t bleed out
- Immune activity increases to protect against infection

**Visible Effects:**
- Pupils dilate
- Heart rate and BP spike
- Breathing rate increases
- Mouth goes dry (shutting down digestion)
- Skin sweats making you slippery and harder to puncture
- Muscles tense
- Senses and perception sharpen; time slows down
- You feel the urge to urinate or defecate making you lighter/faster
- Hair stands on end to make you big and scary

"A mind focused on doubt and fear cannot focus on the journey to victory."

~ Mike Jones
Here's my illustration of proper breathing (qigong style!):

1. Breathe into the lower lungs as the abdomen relaxes slightly outward
2. Allow the lungs and upper chest to fill as well
3. As the body relaxes with the exhale, the upper chest deflates first,
4. Then the abdomen relaxes in, completely expelling the air from the lungs.

This seated breathing exercise can be repeated for 10 to 15 minutes if you like, with wonderful results for mind and body.

Excerpt from The Complete Idiot's Guide to T'ai Chi & Qigong

Rotating Winch is a Qigong exercise that uses spontaneous breathing
Your Body will react to major stressors in one of these ways
Fight, Flight, Freeze or Face your problems

“HUMAN BEINGS, WE HAVE DARK SIDES; WE HAVE DARK ISSUES IN OUR LIVES. TO PROGRESS ANYWHERE IN LIFE, YOU HAVE TO FACE YOUR DEMONS.”
Meditation. Meditation doesn't have to be complicated and you don't have to do it for an hour to reap the benefits. I like to do a meditation called the "5-8 Meditation", which is a simple breath awareness technique. All you have to do is sit in a comfortable position and breath into your relaxed belly through your nose for 5 counts, pause, and exhale slowly through your nose for 8 counts. Just be aware of how your breath feels and allow any thoughts to pass through you.

If you'd like to add a visualization, you can imagine cool, white light or water flowing down through the center of the top of your head and washing through you, taking any tension and stress with it. You can start with 5 minutes. Doing this in the morning before you start your day can have a profound effect on your whole day. It's also a great way to end the day.

For those who suspect mild adrenal fatigue or just need a little extra help with handling stress:

Besides taking advantage of the suggestions above, you can use supplements for a little extra help:

-Himalaya Stress Care is one of my favorite adaptogenic, adrenal supplements. It's been extensively researched over the decades (see Geriforte research papers) and is proven to reduce cortisol and boost adrenal function (it's also a great antioxidant!) You can take the recommended dose for maintenance or take a higher dose during periods of stress and/or fatigue.
Stress hives are also known as stress urticaria. They develop due to chronic stress or tension, and appear as red raised areas and swollen areas on the skin that seem to suddenly appear. Stress hives cause itching most of the time, and some people report having a burning or stinging sensation wherever they appear. Stress hives will go away by themselves when you have successfully released ALL the stress from your body or taken an appropriate stress hives treatment that will eliminate your symptoms.
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<th>Compound</th>
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<td>ADRENOCORTICOTROPIC HORMONE</td>
<td>[ACTH Corticotropin A]</td>
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Spontaneous????

Seems like magic but it is just the Eductor

Eductor is on
Eductor is calibrating...
Eductor is working...
Eductor is working...
Eductor is working...
Eductor is working...
Eductor is working...
Eductor is working...
Training finished
Adrenal Crash and Recovery Cycle - Part 1

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Introduction

The adrenal glands are the main stress modulation centers of the body. When stressors (either physical or emotional) overwhelm the adrenals ability to compensate, Adrenal Fatigue may ensue. This is usually a slow and insidious process that progresses through many years, though some can experience it after an intense episode of acute stress, such as death of a loved one, financial distress, or acute infection.

The job of returning the body to its normal function rests with the adrenals. This process is indeed complicated and convoluted, accompanied by many unpleasant symptoms. They are mediated...
primarily by hormones. The main ones are cortisol, adrenaline, estrogen, and androgen. The adrenals bear the brunt of this responsibility, as it secretes over 50 different hormones in an exact and very precise manner to maintain normal internal homeostasis. Adrenal hormones in turn affect other hormones in the body, ranging from thyroid hormones to serotonin to insulin. The state of dysregulation of these hormones results in unpleasant and abnormal physiological responses during an acute adrenal decompensation episode. It is the body's way of returning to a lower state of physiological function where conservation of energy becomes a primary focus for survival.

Adrenal crash is therefore the body's strategy of returning to a state of simple living dominated by bed-rest.

If the adrenal's compensatory emergency response effort is successful, the adrenal crash will eventually stop and the body will begin to stabilize and gradually return to its pre-crash state of function through what is known as the Recovery Phase. The Crash and subsequent Recovery Phase taken as a whole constitute the Adrenal Crash and Recovery Cycle. Unpleasant symptoms slowly disappear during the recovery cycle. If not successful, the body will continue to decompensate until such time as external help is rendered to support the adrenals and arrest the crash. In the absence of that, the body will naturally and slowly deteriorate, ultimately resulting in adrenal failure.

Total adrenal failure is a medical emergency, but there are several measurable degrees of Adrenal Fatigue before adrenal failure. These Adrenal Fatigue states (Adrenal Fatigue stages 1-4) usually progresses with time and is triggered and exacerbated and marked by periodic adrenal crash and recovery cycles.

This paper will examine the adrenal crash and the recovery cycle in great details as they are found in each of the Adrenal Fatigue stages. Due to the lack of quantitative and laboratory investigative tools, findings presented here is primarily based on the clinician's perspective.

The Physiological Basis of Adrenal Crash

As mentioned above, Adrenal Fatigue is the body's strategy for returning to a simpler physiologic form of function as a way to conserve energy. The more advanced the fatigue, the lower the physiological basis. The most basic physiological state is prolong bed rest. We call it hibernation in the animal kingdom. When an animal hibernates, it expends a minimal amount of energy. It comes as no surprise that those with adrenal crashes or in advance stages are often bed-ridden.

No organ is spared as the body down-regulates during a crash or as Adrenal Fatigue worsens and the body returns to a simple state. Multiple organ systems are involved. The first systems to
turn off are those not required for basic survival. Reproduction is considered a luxury and not a vital function when survival is at stake. Libido as a result is lowered. The thyroid also goes into a slow down mode as the body attempts to reduce the basal metabolic rate (idle speed) to conserve energy. This naturally leads to sluggishness, constipation, and worsening fatigue. The gastrointestinal tract as a whole tends to slow down in its assimilation of food. Complex and processed foods become hard to digest and less is absorbed. Digestive enzymes and acid release are reduced. Gastric motility slows. As a result, foods do not churn as much compared to that of a normal healthy person. Poor digestion is common, accompanied by reduced absorption, increased gas, bloating, and constipation.

As this happens, the liver and kidney functions are also affected. Both are the clearing houses of the body's toxins. As liver function slows (though laboratory tests are usually normal), complete breakdown of metabolites becomes compromised. Overall, body clearance of such by-products tends to slow concurrently as toxic metabolite build up occurs as a result. Fat-based metabolites tend to find their way into areas of the body high in fat as they attract each other. Lipophilic organs (organs that like fat) such as the brain have a tendency to attract such fat based metabolites easily. Instead of a normal complete clearance out of the body on a timely basis, such metabolites tend to accumulate instead. **Metabolites that accumulate in the brain can lead to and contribute to memory loss, confusion, anxiety, and brain fog.** Normal brain function may be impaired if severe. Some accumulate in joints and muscles, leading to muscle pain of unknown origin and joint inflammation. The number of symptoms becomes overwhelming.

**The down-regulation or return to simplicity will continue as long as the body sees it as a positive step to conserve energy for survival.** As the body further slows down, muscle breaks down to generate energy, leading to an overall net loss of protein and muscle mass. When this happens, the body enters a catabolic state, with overall weight loss and muscle wasting. **Fibromyalgia and chronic fatigue may ensue.** Appetite reduces as the gastrointestinal tract motility slows. Those with sugar imbalances and insulin resistances are particularly vulnerable to a worsening state. **Electrolyte imbalance becomes common.** If the condition does not reverse, the body goes into an alarm reaction, activating the fight or flight response and release of adrenaline. Too much adrenaline can further propagate this viscous downward cycle. The normal negative feedback loop of hormones derails and soon a less stable positive feedback loop replaces it. Because positive feedback loops are inherently unsteady, the body moves closer to crashes with the smallest trigger. **Ultimately, if not resolved, the body will collapse—a return to ultimate simplicity.**

The myriad of physical symptoms mentioned above is convoluted and appear confusing. However, the progression is quite logical and clear if you see them as the body's way of slowing down. Indeed, like a domino effect, the shutting down process happens in steps. **At the end, the body is reduced to bed rest. Ambulatory help for daily chores are required. Fatigue is extreme with the gastric system paralyzed, heart rate irregular, mental function**
clearly compromised, while the feeling of wired and tired abounds, as adrenaline is high when energy is low.

This continuum of down-regulation will not stop until the body finds its equilibrium. This is the point where energy demands slow to a point that matches the input. This is the point when the body finally feels it can survive and not threatened. Sad to say many are often bedridden at this state.

Understanding the above down-regulation and return to simplicity during an adrenal crash is very important not only to explain the various symptoms that concurrently arise defying conventional medical logic. It also serves as the basis of our understanding of why certain common remedies and approaches do not work but in fact make things worse when the body is in such a state. Lastly, it serves to guide us on recovery planning.

Anatomy of a Crash and Recovery Cycle

The complete crash and recovery cycle is broken down into two phases: the Crash Phase, where the body decompensates with worsening symptoms, and the Recovery Phase, where bodily function is gradually restored to the pre-crash level of function.

The most prominent symptom during the adrenal crash phase is fatigue and lack of energy. The sum of all dysfunctional and dysregulated hormonal and metabolic pathways ultimately results in reduced energy output as the main outcome. Gauging the energy level during the crash phase therefore gives us the most accurate indication of the severity of the crash over
time. There are no laboratory tests that can quantify this objectively. The more intense and more symptoms coming from the adrenal crash, the deeper and more severe the crash.

The Recovery Phase is marked by a gradual return to pre-crash level of adrenal function and energy level. Symptoms of adrenal crash will reduce and spontaneously resolve as recovery proceeds. The Recovery Phase is further broken down into a stabilization period followed by one or more mini-recovery cycle, each consisting of a preparation period, a honeymoon period, and a plateau period. The three period flow in sequence resembles a set of steps going up. The overall successful recovery plan consists of multiple "S" curves in an upward sustained series without allowing any major downward crashes. This is illustrated in the graph above and it is comprised of the following:

Stabilization Period. Immediately after an adrenal crash and prior to the initial mini-recovery leg up there usually is a stabilization period where the body ceases to decompensate and gradually arrive at a steady state of lower function. As we shall see later, this stabilization period carries an important and significant role in the overall Recovery Phase. The sensation is "the worse is over, but it can come back anytime".

Preparation period. This period normally lasts from 1 day to 6 weeks, depends on the stage of Adrenal Fatigue. The stronger the adrenal function, the shorter the duration. During this time, the body normally may not feel any significant energy difference even though nutrients have been administered, though there is a sense of improved control and reduce sense of impending doom. One continues to feel fatigue, but there is a subtle sense of improvement if one pays careful attention. This is the phase where the body builds its lost reserve and internally gets stronger. It is not uncommon to feel even worse from time to time.

Honeymoon Period. This usually follows immediately after the preparation period and can last a few days to 12 weeks if the preparation period is carried out properly. Again, the duration is highly dependent on the stage of Adrenal Fatigue. Generally speaking, the earlier the Adrenal Fatigue stage, the longer this period can last. The weaker the adrenals, the more tendency for this period to be short-lived unless under professional guidance. During this time the body is able to handle stress better. Fatigue reduces, palpitation frequently dissipates, and anxiety attack diminishes. Blood pressure starts to stabilize, brain fog starts to dissipate, and functional sleep returns. There might be mini-crashes and setbacks from time to time that last a few days. They are more tolerable compared to before, but recovery is faster. There is an overall sense of well being as if a burden has been lifted from one’s shoulder. An overall sense of optimism returns.

Plateau Period. The body is stabilized. There is no set time frame for the duration of this period. Generally, it lasts a few weeks to a few months. In early stages of Adrenal Fatigue, this phase can go on for years and totally asymptomatic. In later stages of Adrenal Fatigue, the picture is much more dismal. Sufferers have to slowly adapt to an overall lower level of energy function. If the
adrenal function is already at its maximum, one can be stuck at this phase for a very long time without upward progress. Many on self-guided programs would not be able rise to the next cycle due to the lack of foresight and planning. This is perhaps the most trying time, as impatience sets in. Most interpret the lack of continuation and sustained improvement as failure and become disappointed. **Yet within this period often is embedded a resetting time where the body can be pushed to a higher level of function if take advantage of properly.**

**Most Adrenal Fatigue sufferers, especially those with advance weakness, go through multiple crash and recovery cycles over time.** A careful analysis and comparative study of triggers and accompanying symptoms of each cycle over time serves as a good guide on overall adrenal function.

**Have You had Your Crash Today?**

Adrenal Fatigue sufferers are no strangers to "crashes". The crashes are usually the first alarm bell to ring early on in Adrenal Fatigue. At first they appear harmless, and can be as simple as a short period of exhaustion that recovers spontaneously after taking a nap or a sugar fix; or by way of a caffeine crash after the stimulatory effect of caffeine has worn off. With time, crashes become more intense and more prevalent. In severe cases, crashes can be triggered by something as simple as taking a longer than usual walk, and can last for months. They can vary greatly in intensity, depending on the stage of Adrenal Fatigue.

With each crash, the body usually recovers on its own. Internally, the body gets weaker with each crash. If not properly nurtured back to full function, these small crashes become more frequent, and more intense. Over time, as the body gets weaker, the recovery time also lengthens. The body enters stage 1 of Adrenal Fatigue and slowly gets worse, advancing to stage 2 and 3, and ultimately adrenal failure if no steps are taken to repair the damage.

Minor crashes can occur infrequently in the early stages of Adrenal Fatigue (stage 1 and 2), and every few days in late stage Adrenal Fatigue (stage 3 and 4). Major crashes usually only occur once every few years in early Adrenal Fatigue, but can occur as frequently as every few weeks in late stage Adrenal Fatigue such as adrenal exhaustion (stage 3). In such cases, the body never really gets a chance to fully recover. It goes through one crash cycle after another. If corrective steps are not taken to nurture the adrenals back to health, the body becomes preoccupied with fighting the crashes and trying to recover and function normally while being on the alert for the next crash. This constant state of alertness and repeated activation of the emergency system of the body to overcome crashes eventually drains the body of much needed energy, leading to a state of chronic fatigue and physical exhaustion.

In severe cases (adrenal exhaustion stage 3C or 3D or beyond), the sufferer may be bedridden in a state of what is described as "living hell" or "walking dead". On the outside
they look normal. On the inside, they can hardly function. **Conventional medicine's understanding of this state is unfortunately quite poor.**

**Common Causes of Adrenal Crashes**

All adrenal crashes are precipitated by some form of stressor event, if one looks deep enough. Such events may be obvious (such as death of a loved one) or minor (such as taking a long walk). Small crashes might also delude detection. It is of paramount importance that the cause of each crash be fully investigated. The same stressor will likely trigger subsequent crashes. This is where an expert clinician's guidance is critical. History will likely repeat itself if no steps are taken understand what triggers the current crash and steps taken to prevent it from occurring again.

Examples of situational stressors that can trigger adrenal crashes include: overwork; dehydration; long road trips; vacation; dental procedures; infection, overexposure to sun, lack of sleep, sexual intercourse with ejaculation, drinking soda or coffee, medication withdrawals, especially steroids; thyroid medication sensitivity, especially T3; infection such as the flu or insect bites; overmedication such as the use of steroid and anesthesia with epinephrine, investigative procedures such as ACTH stimulation test. Other stressors trigger include: over use of stimulatory supplements, metal toxicity, excessive exercise, exposure to heat such as sauna or steam room, exposure to toxic fume, prolonged standing, overly anxious, relationship difficulty, death of a loved one, long airplane or car trip, sexual intercourse especially with ejaculation, moving, overly aggressive detoxification such as enema, homeopathy, certain massages or acupuncture, excessive improper breathing and use of stimulatory breathing exercises, and excessive stimulatory entertainment such as watching an action movie or riding a roller coaster.

**It is important to note that the more advanced the Adrenal Fatigue, the less intensity the stressor needs to be to trigger an adrenal crash.** The body's reserve in advanced Adrenal Fatigue is already low and very close to hovering above the adrenal symptom threshold level. It does not take much to cross this threshold as the crash occurs.

**Symptoms of an Adrenal Crash**

Not all adrenal crashes and recovery cycles are symptomatic. **Those with stage 1 and early stage 2 Adrenal Fatigues may not even be aware, especially if there are sufficient adrenal reserves at hand to compensate and ensure normal daily function. On the other hand, symptoms are universally present for those in stage 3 and 4 Adrenal Fatigue when they crash, and their symptoms vary greatly in severity.**

Symptoms of adrenal crash represent a sudden intensification or abrupt onset of the many already existing pre-crash Adrenal Fatigue symptoms, such as:
- Drastic reduction in energy and increased fatigue.
- Muscles don't regenerate and are lost to provide sugar to the brain, with drastic increase in brain fog and dizziness.
- Low blood sugar and frequent hypoglycemic episodes with lightheadedness as sugar regulation becomes dysfunctional.
- Major change in mood stability leading to depression, anxiety, irritability, and rage.
- Lower immune function leading to more infections, shingles and slower recovery.
- Loss of the steroid hormone precursors DHEA, leading to low testosterone or imbalanced estrogen and progesterone levels. These hormonal changes are often seen in women as significant estrogen dominance symptoms appear; such as water retention, hot flashes, insomnia, bloating, sugar cravings, and emotional changes. In men, libido is lost.
- Poor digestion from the constant decrease of metabolism, with irregular bowel movements, constipation, irritable bowel.
- Uncontrolled stress response triggered by adrenaline rush with exaggerated symptoms such as anxiety, depression or physical shaking for a period of time after a stressful situation or sugar crashes. People will also start to perceive situations to be more stressful than they are, due to the exaggerated responses.
- Fibromyalgia with joint pain as the body enters a catabolic state.
- Hypothyroidism due to the inhibition of thyroid hormone activation and also suppression of the controlled release of hormone from the thyroid. Dry skin and weight gain is common.
- Chronic fatigue from the constant stress stimulation and insomnia. The sensation of being "wired and tired" is common, with inability to fall asleep.
- Metabolic imbalance and sugar dysregulation, with bouts of awakening in the middle of the night with cold sweats, palpitations, and hunger pangs.
- Arthritis flare-ups from the poorly regulated inflammatory pathways.
- Acne and hair loss from imbalance in hormones and poor immune response.
- Immune imbalances and decreased immune function, frequent infection, and poor healing.

You need not have all of these symptoms to have an adrenal crash. Sometimes, you only have a few of them, but they are usually severe. Sometimes the degree of decompensation can be quite mild and minor. Other times, they can be severe and major. Generally speaking, the more intense the symptoms, the more severe is the crash. Crash intensity can be classified into five levels which will be explained later. **One can experience any degree of adrenal crash at any stage of Adrenal Fatigue.**

### Adrenal Crash Intensity

Clinically, Adrenal Fatigue Crashes are classified into 5 levels based on subjective evaluation. Levels 1 and 2 are considered minor crashes with good recovery potential, while levels 3, 4, and 5 are considered major crashes and have a much less certain Recovery Phase.
Level 1 - loss of 10-19% of immediate pre-crash baseline level of adrenal function in terms of energy, metabolic imbalance such as hypoglycemia, and emotional function such as irritability. Typically, there is a sense of being more tired than usual, more irritable, and a sense of being hungry earlier than normal. Normal outside work as well as household chores can be completed, though a sense of tiredness is felt at the end of the day. A nap can be extremely helpful and the sense of recovery is felt after rest.

Level 2 - loss of 20-29% of immediate pre-crash baseline level of function in terms of energy, metabolic imbalance such as hypoglycemia, and emotional function such as irritability. Typically, there is a definite reduction in energy, but that can be compensated practically by a nap or laying down for 30 minutes. Emotional stability is less, and easily irritated. When it is time to eat, there is a sense of relief. The ability to perform normal outside activities such as a job or regular household chores is compromised, but can be forced to be completed if needed to. Even with a nap and rest during the day, the body is tired and not quite the same. The body is under strain.

Level 3 - loss of 30-39% of immediate pre-crash baseline level of function in terms of energy, metabolic imbalance such as hypoglycemia, and emotional function such as irritability. Typically, the energy level is low throughout the day. Even with rest and a nap, the body remains very tired. There is moderate reduction in the ability to perform all outside activities as well as household chores. One feels like staying home all day and not just for a few hours to rest. Anger, short tempered, and rage is common. The body craves sugar for energy at times. Insomnia is worse, and in many cases, accompanied with cold sweats, heart palpitations and dizziness.

Level 4 - loss of 40-49% of immediate pre-crash baseline level of function in terms of energy, metabolic imbalance such as hypoglycemia, and emotional function such as irritability. Typically, there is severe fatigue throughout the day. Unable to do most household chores, and the body feels totally drained. Emotionally depressed and too weak emotionally to get angry. Food or supplements that generates energy before may make things worse. Unable to get to do outside chores is a key characteristic. Those who are working will be unable to go to work. Even sounds from the TV can be irritating. Once in bed, it’s hard to get up other than to go to the kitchen to prepare food.

Level 5 - loss of greater than 50% of immediate pre-crash baseline level of function in terms of energy, metabolic imbalance such as hypoglycemia, and emotional function such as irritability. Bedridden most of the time, getting up only to accomplish the basic personal hygiene chores. It's not unusual to require assistance for ambulation or taking a shower or changing clothes.

One can have any number of minor or major crashes during any stage of Adrenal Fatigue.

Adrenal Crash and Recovery Progression through Stages 1 to 3 of Adrenal Fatigue
The following diagram shows the typical general progression of Adrenal Fatigue over time, with steady deterioration during Stage 1 and 2 that is generally asymptomatic. This is followed by a rapid and functional decline in Stage 3 which is especially severe in Stage 3C. If unattended, the natural progression ends in adrenal failure. The exact progression varies from person to person with wide variations.

There are many crashes and recovery during along the way. Let us start to examine more closely the natural of these crashes in each stage.

**Stage 1 Adrenal Fatigue (Alarm Reaction)**

In this stage, the body is alarmed by the stressors and mounts an aggressive anti-stress response to reduce stress levels. Some doctors called this the Early Fatigue stage. Unfortunately, this sub-clinical state is seldom recognized as a pathological condition. Blood sugar levels become imbalanced, resulting in low energy. This dysfunction is temporarily patched by the intake of quick fixes such as high sugar content soda drinks, energy potions, and high carbohydrate foods such as donuts. Many people even consider this state "normal" as part of living in the modern society under stress. Those who require coffee to start the day may already be in this stage and not be aware of it.

Crashes in this stage is usually minor (Level 1 or 2), though a major crash (Level 3 or higher) may occur once every few months and a major crash every few years. No physical symptoms before, during, or after the crash other than mild discomfort are reported because symptoms at its worse are still above the Adrenal Symptoms Threshold (AST). If a major crash occurs,
recovery usually takes a few days or weeks at most and full recovery is achieved. Crashes in this stage usually go unnoticed and is only evident on retrospect.

Stage 2 Adrenal Fatigue (Resistance Response)

With chronic or severe stress, the adrenals eventually become unable to compensate. Normal daily functions are still able to be carried out, but the sense of fatigue is pronounced at the end of each day as the body needs more rest than usual to recover. Despite a full nights rest, the body often does not feel refreshed in the morning. Anxiety starts to set in, and the person becomes easily irritable. Insomnia becomes more common, as it takes longer to fall asleep. There are also frequent awakenings as well. Infections become more recurrent. PMS and menstrual irregularities surface, and symptoms suggestive of hypothyroidism (such as a sensation of feeling cold and a sluggish metabolism) become prevalent. The thyroid glands are usually affected at this stage. Sluggishness, feeling cold, and central weight gain, despite exercise and diet, are the predominant symptoms that usually bring patients to their physicians for the first time. Many are prescribed anti-depressants and told there is nothing wrong physically. Those who require multiple cups of coffee to sustain themselves may well be entrenched at this stage without knowing it.

Compared to stage 1, the frequency of minor and major adrenal crashes is higher. The intensity is also increased. AST has been penetrated on the downside. A mild degree of adrenal symptoms are usually present before the crash, but not always. During the adrenal crash, these symptoms are made worse and exaggerated, but still manageable. Many recover fully with no symptoms after the crash as they rise above the AST, but not all are so fortunate. A significant number remains symptomatic below the AST after recovery with symptoms that are slightly worse than the state they were in pre-crash. These crashes are often what brings the sufferers to their physicians for the first time.

In the figure below, we see a graph covering stage 1 and 2 Adrenal Fatigue and the progression of each crash and recovery cycle. The adrenal function is plotted against time. Note at some point in adrenal function, a level comes into play where the sufferer goes from asymptomatic (no symptoms) to symptomatic. This is the called the Adrenal Symptoms Threshold (AST). Crashes that occur above this threshold are generally asymptomatic. They are generally unnoticeable unless the sufferer is attuned to his own body condition. In stage 1 Adrenal Fatigue, a crash is generally followed by an immediate recovery, both of which occur above the Adrenal Symptoms Threshold (AST). At most, there may be a brief period of exhaustion. A total recovery is expected with a short nap or drinking coffee.
With each crash, the remaining adrenal function is reduced slightly after recovery. The more crashes occur over time, the weaker the adrenal function becomes. Fortunately for those in this stage, there is adequate adrenal reserve as the AST has yet to be penetrated on the downside. As a result, Adrenal Fatigue as a trigger or cause is frequently overlooked. This can go on for years and decades.

**Crashes associated with stage 2 Adrenal Fatigue are characterized by a higher intensity of symptoms compared to crashes associated with stage 1.** The pre-crash energy level is lower than stage 1 Adrenal Fatigue at the baseline to start. At the height of the crash, the adrenal function usually descends and penetrates the AST. Physical debilitating symptoms start to appear, including high blood pressure, insomnia and low blood sugar. As with crashes associated with stage 1 Adrenal Fatigue, each crash and recovery cycle end at an adrenal function status that is slightly compromised compared to before. This is a gentle downward cascade of functions resembling a waterfall or a series of steps going down. The duration of the Recovery Phase is at least 2 times or more longer when compared to that experienced in stage 1 Adrenal Fatigue.

**Stage 3A Adrenal Fatigue (Chronic Single System Dysfunction)**

As the body enters Adrenal Exhaustion (stage 3), the clinical picture changes drastically for the worse. In this phase, mild symptoms characteristic of first and second stage Adrenal Fatigue continue to worsen and become persistent or chronic. Just to mention a few symptoms: the slightly elevated blood pressure now becomes low throughout the day, mild musculoskeletal pain turns into chronic fibromyalgia around the clock, frequent recurrent infections are the norm in comparison to
intermittent infections, occasional mental feeling of "blues" becomes mild depression, sleep patterns become more disrupted as insomnia becomes chronic, and fatigue that usually occurs during the end of occasional stressful days becomes an everyday event. There is a moderate reduction in carrying out normal daily activities. Most people are exhausted after a full day's work. Not all organs are dysfunctional to the same degree at the same time. The organ system that is constitutionally weakest is the first one to decompensate, while another organ system appears to be intact.

Minor crashes are becoming increasingly common, occurring once every few weeks. Major crashes usually occur once every 6 to 12 months. Symptoms are prevalent pre-crash, and because most are long-standing, the sufferer has adapted to them with their daily life function at a lower energy baseline level. During the adrenal crash, the symptoms worsen. Even after recovery, the body remains in symptomatic state below the AST most of the time.

Stage 3B Adrenal Fatigue (Multiple Endocrine Axis Dysfunction)

The endocrine system in our body is linked hormonally in a series of axis for optimal function. Dysfunction in one system invariably affects the others, leading to a cascade of decompensation as the body weakens. In this phase, the ovarian-adrenal-thyroid axis in women and adrenal-thyroid axis in men are particularly compromised. When these axis become imbalanced, the adverse feedback loop creates a vicious cycle of cascading decompensations, involving multiple organ systems at the same time. Typical presentations in the female involve symptoms of under-active thyroid, imbalanced ovarian hormones, and low adrenal function. In the male, the adrenal-thyroid axis may be compromised. Sufferer's physical and emotional states continue to deteriorate and they enter into a state of confusion in this phase. They are unable to logically dissect the myriad of systematic manifestations of multiple hormonal axis imbalances.

Compared to those experiences in stage 3A Adrenal Fatigue, crashes are usually more intense and more frequent as the adrenal reserve is depleted. It is not uncommon to have minor crashes every 1-2 weeks, and major adrenal crashes every few months. The body never fully recovers to a point that the energy is consistently above the AST at any point in the crash and recovery cycle.

Stage 3C Adrenal Fatigue (Dis-Equilibrium State)

As the body continues its downward path of impaired functions, it gathers steam. Gradually, the body becomes severely compromised in trying to maintain the fine controls of homeostasis. Normal equilibrium is therefore lost. The body will try its hardest to maintain equilibrium; but its crude compensatory response, damaged receptor sites, along with impaired metabolic and detoxification pathways of a low clearance state, give rise to paradoxical and exaggerated responses. This is usually mediated through the autonomic nervous system. Clinical manifestations include swings in blood sugar level, with reactive hypoglycemia being the hallmark, along with fragile blood pressure
state, postural hypotension, inability to remain standing for a prolonged period of time, reactive sympathoadrenal responses including heart palpitations, night sweats, and a state of reactively driven anxiety followed by depression. Normal ambulatory and functioning time is usually very much restricted.

**Crashes that occur in this phase are fast and furious. Minor adrenal crashes can occur every few days, and major ones as often as every few weeks.** There is a roller coaster ride of ever worsening symptoms. It is not unusual for one to go from minor crash immediately into a major crash before the minor crash has even completed its recovery. There is a state of constant fatigue, with severe energy depletion. The highest rate functional decline occurs at this phase. A major crash can be very scary, and may require trips to the Emergency Room.

**Stage 3D Adrenal Fatigue (Near Failure)**

As the body's cortisol hormone level falls below the minimum required reserve for normal function and output fails, the body continues to down-regulate the amount needed in order to preserve what is on hand for only the most essential body functions. Pump-failure occurs. This down-regulation further reduces cortisol output, exaggerating a vicious downward cycle. Toleration to steroids may be blunted or negated. Normal nutrients are often systemically rejected by the body, even at low doses.

Those who are in this stage often live in the hopeless state of constant crashes. The body is too drained to mount a productive response. Adrenal crash symptoms are usually extreme. **Minor crashes can be intermingled with major crashes.** Emergency room visits are common due to unstable blood pressure, irregular heart rate, and severe anxiety with a sense of impending doom. Sufferer is usually bedridden requiring assistance for daily chores and personal hygiene functions.

The following figure shows how the same process works in those with Adrenal Fatigue stage 3A to 3D Adrenal Exhaustion. In this stage, the intensity of body crash continues to increase, despite a crash time that may or may not be much longer than that of earlier stages. However, clinical observation shows that the **Recovery Phase is exponentially longer. Recovery Phase for stage 3C crashes can be 20 times or more, longer than that of stage 1.**
In addition to longer recovery time, sufferers remain symptomatic below the AST throughout almost the entire crash and the recovery experience. Those in Adrenal Exhaustion have a very low adrenal pre-crash reserve at baseline. Their pre-crash adrenal function is hovering slightly above the adrenal symptoms threshold during the best of times. It does not take much external stressors to push the adrenal function lower and cross the threshold into the symptomatic area. Compared to earlier stages, stress triggers can simply be something that would not have triggered a crash in early stages. This may be a longer than usual walk or inadequate fluid intake. The body is much more sensitive to stressors as adrenal weakness progresses.

The following summarizes crash symptoms clinically:

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<th>Adrenal Fatigue Stage</th>
<th>Interval Between Level 1 and 2 Crashes</th>
<th>Interval Between Level 3,4,5 Crashes</th>
<th>% Symptomatic Pre-crash</th>
<th>% Symptomatic During Crash</th>
<th>% Symptomatic During Recovery</th>
<th>% Symptomatic Post Recovery</th>
<th>Degree of Adrenal Crash Symptoms</th>
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<td>100%</td>
<td>85%</td>
<td>severe</td>
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<tr>
<td>3D</td>
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<td>100%</td>
<td>100%</td>
<td>severe</td>
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Crash Management

The key to managing an adrenal crash is to reduce the crash velocity, lessen the intensity, and administer proper nutrients at the right time to propel the system into recovery as soon as possible.

Minor adrenal crashes (loss of 10 percent to 29 percent of energy) usually go unnoticed in Stage 1 and 2 of Adrenal Fatigue. All crashes are noticeable in Stage 3 and 4 of Adrenal Fatigue. Major crashes involving a loss of 30 percent or more of energy can be devastating at any stage.

The more advanced the Adrenal Fatigue, the less reserve is present in the body, and therefore, the faster the crash. The same stressor that takes a few days to trigger a crash in those with Stage 1 and 2 Adrenal Fatigue may only take a few hours to cause the same damage in those with Stage 3 and 4 Adrenal Fatigue. Crash intensity is also greatly magnified in terms of symptomatology—the weaker the adrenals, the cruder the way the emergency systems are activated.

Proper crash management requires individualized attention. Everyone is different, and there are no standardized protocols. What may be fitting for one person may actually make another person worse. The following are key areas to be addressed during crash management:

- **Physical Activity.** Usually this means immediate reduction of unnecessary physical activity and an increase in rest. Exercise in particular, needs to be adjusted to match the energy state of the body. In early Adrenal Fatigue, a crash usually presents itself in nothing more than mild fatigue. Exercise increases adrenaline release and blood circulation, which might result in a short-term energy boost. Unless this is followed by adequate rest, over-exercise can drain the body and trigger follow-up crashes. Complete rest in bed, on the other hand, is not necessarily the best either. A personalized program of Adrenal Restorative Exercises and Adrenal Breathing Exercises is very helpful. As the body is very sensitive to even the slightest stress, one must be careful to adjust the intensity and frequency to match the body's state to avoid triggering further crashes. For example, 80 percent breathing intensity may not be tolerated during a crash and should be adjusted down to 50 percent or less. Improper breathing techniques, such as prolonged holding, or shallow breathing can also increase sympathetic tone and trigger further adrenal crashes.

- **Dietary Adjustments.** Hypoglycemia and metabolic imbalances are common during an adrenal crash. Proper dietary adjustment focuses on stabilizing blood sugar by balancing the amount of carbohydrate, protein, and fat in the diet. Gastric assimilation is often compromised during a crash. The proper delivery system of macro-nutritional form needs to be considered to facilitate absorption and nutrient delivery to the cell. For example, raw milk may be superior to regular milk, and raw egg is better than
cooked egg in such cases. Those who have had severe crashes might not be able to tolerate regular food and therefore need to be on a special chicken broth and raw colostrums for foundational nutritional support. Severe cases might actually need hospital admission for total parental nutrition.

- **Electrolyte Adjustments.** A common symptom of Adrenal Fatigue is salt craving due to the sodium imbalance caused by hormonal dysfunction. This imbalance is usually worse during a crash. The rebalance process needs to be carefully titrated and controlled to avoid making the situation worse. Too much sodium relative to water may lead to hypertension and too little water may lead to dehydration and compound the crash. Too much water relative to sodium may lead to dilutional hyponatremia. Unfortunately, laboratory values may be normal during the crash and will not be abnormal until the crash is well advanced. Those on diuretics or medications who have a history of high blood pressure need to be especially careful. Symptoms such as nausea, vomiting, headache, malaise, and foggy thinking are common. Severe case may actually need hospital admission.

- **Nutritional Supplement Adjustments.** Administration of nutrients during an adrenal crash requires careful consideration. Blindly taking the same dosage of supplements during a crash as before the crash can worsen the fatigue. The state of the body is very different during a crash. Animals under stress, for example, need up to ten times more vitamin C compared to normal. Some of the key determinants of the amount of nutrients to take during a crash include biological constitution, clearance state, history of paradoxical reaction and autonomic system sensitivity. For example, those with low clearance state will benefit greatly if nutrients are temporarily reduced during the crash. On the other hand, increasing the nutrient level during a crash or immediately thereafter can be beneficial to those with normal clearance states as the body needs more during a stressful crisis. Taking advantage of this can turn a potentially devastating crash into a sweet honeymoon, a welcome event for all.
Adrenal Insufficiency

Adrenal insufficiency is a condition in which the adrenal glands, located above the kidneys, do not produce adequate amounts of steroid hormones (chemicals produced by the body that regulate the function of other organs). There are many causes of adrenal insufficiency. Certain diseases cause permanent adrenal insufficiency while other conditions cause temporary adrenal insufficiency. Some medications can also result in temporary adrenal insufficiency. Adrenal insufficiency can also occur when the hypothalamus or the pituitary gland, located at the base of the brain, does not make adequate amounts of the hormones that assist in regulating adrenal function. The November 16, 2005, issue of JAMA includes an article about adrenal insufficiency.

Symptoms of Adrenal Insufficiency

Typical symptoms of adrenal insufficiency include unusual tiredness and weakness, unintended weight loss, nausea, diarrhea, dizziness, loss of appetite, joint pain and belly pain, salt craving, and darkening of the skin. When levels of ACTH or CRH are affected, people can feel well most of the time but have low blood pressure or low blood sugar during times of extreme stress. To diagnose adrenal insufficiency, doctors need to determine blood levels of the steroid hormones and then perform other tests to determine the cause of any deficiency.

Treatment of Adrenal Insufficiency

If adrenal insufficiency is untreated, serious illness or even death can occur. Synthetic (manufactured) glucocorticoids that replace the deficient adrenal steroid hormones are the main treatment. They must be taken daily and as directed to keep the body in balance. Synthetic mineralocorticoid and androgen medications may also be necessary. If you have adrenal insufficiency and are sick or under physical stress, you may need to take glucocorticoids to counter the excess stress on your body. Discuss with your doctor the need for adequate glucocorticoid replacement if you are having surgery, major dental work, or other invasive procedures or if you are sick with a fever, vomiting, or diarrhea.

Medical Alert Bracelet

During an emergency, medical personnel need to know if you have adrenal insufficiency. It is very important that persons with adrenal insufficiency always wear a medical alert bracelet indicating the need for a lifesaving glucocorticoid injection. You should also carry a list of your current medications and their doses as well as your doctor’s name and contact information. If you live in a remote area or are planning travel, your doctor can prescribe an injection kit for emergencies.

For More Information

- National Institutes of Health
  Clinical Center
  www.cc.nih.gov
- National Institute of Diabetes
  and Digestive and Kidney Diseases
  www.niddk.nih.gov
- The Hormone Foundation
  800/467-6663
  www.hormone.org

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Crash to Honeymoon

While an adrenal crash is one of the most dreaded and difficult period to manage in Adrenal Fatigue, there is often a silver lining.

During a crash, the body first goes through a series of adaptation to return to homeostasis. When this fails, various internal emergency systems are activated automatically. The more intense the crash, the more the response becomes evident and exaggerated. As a result, unpleasant and paradoxical symptoms are made worse, this results in a worsening downward cascade of fatigue as the crash progresses. At peak of the crash, the energy may be so low that one may be bedridden. Eventually, the body usually is able to regain internal control, except for those who have very weak constitutions. It then enters a stabilization period, to be followed by a preparation period before the body starts its honeymoon period of recovery. This is graphically shown as Curve A in the diagram below.

During the crash, the body is actually hungry for more nutrients to overcome stress. Much of the internal reserve is utilized and metabolized in its effort to soften the crash. Nutrients needs to be replenished as quickly as possible once utilized. Additional nutrients may be considered to support the body during this process. Unfortunately, the body is concurrently in a low clearance state during Adrenal Fatigue. In its best effort to conserve energy, many organ systems are put on a "slow down" mode of function. Gastric absorption is slowed and liver detoxification rate is reduced. As excretory capacity is compromised, breakdown byproducts accumulate within the body and turn toxic. Symptoms such as brain fog, joint pain, muscle ache, etc are common as a result, making the crash worse or triggering subsequent rolling crashes. Extra nutrients administered during this time of low clearance state can lead to a variety of toxic and paradoxical reactions. Instead of getting better, the crash worsens. This is graphically shown as Curve D in the following diagram:
Those in a low clearance state should therefore temporarily avoid additional nutrients during an adrenal crash. Nutrients should be titrated downwards to allow the body to first clear existing metabolites out of the system in order for the body to stabilize as shown in Curve A in the diagram above. Aggressive detoxification such as enema, cleanses, massages and acupuncture should also be avoided unless under professional guidance, as they can worsen the condition as more toxins are released, leading to a re-toxification reaction. This is shown as Curve D in the diagram above.

Those with a stable or normal clearance states, on the other hand, can tolerate more nutrients during or after a crash. Additional nutrients can be of great help to cushion the crash intensity, reducing unpleasant and paradoxical reactions as well as affecting an overall faster entry to the recovery phase during the crash (Curve B in above diagram) or at the peak of the crash (Curve C in above diagram). With proper timing and dosage, these nutrients can have significant benefits. Not only is the crash intensity reduced, but the body can be propelled into the honeymoon period of the recovery phase directly from the crash phase, resulting in an earlier recovery. The stabilization and preparation period can be bypassed. One can go directly from crash to honeymoon, as shown in Curve B and C in the above diagram.

Clearly, determining the clearance state is an important parameter in any adrenal crash management program. Unfortunately, there is no laboratory test available in determining the clearance state and thus no automated program to facilitate the recovery process. However, an experienced clinician is usually able to determine the clearance state based on a detailed
medical and nutrient reaction history. Seeking the proper qualified specialist is therefore critical for those who frequently experience crashes.

Duration of an Adrenal Crash and Recovery Cycle

Once a crash has occurred, one of the most difficult questions to answer is the length of crash and its subsequent recovery period. Sometimes, one can crash and recover within a few hours. On the other end of the spectrum, the complete cycle can take a few months. There is no quantitative measurement that can precisely calculate or predict cycle duration. The best estimate comes from a combination of past history, clinician's experience, and the state of adrenal function immediately prior to the crash (also called baseline).

Let us examine how Adrenal Fatigue staging at baseline correlates with cycle duration. The following figure represents a graph of the average speed of crash and recovery as it relates to various stages of AF.

The more advanced the Adrenal Fatigue, the faster and the more intense is the Crash Phase. In other words, those in Stage 3C or 3D Adrenal Fatigue crash much faster and with deeper intensity compared to those in stages 1 and 2.

The Recovery Phase characteristic and duration also varies greatly depending on the state of adrenal function immediately pre-crash (baseline). Recovery for those with Adrenal Fatigue stage 1 tends to occur quickly. As adrenal weakness increases, the duration of Recovery Phase increases exponentially. In other words, stage 2 recovery may be doubled that of stage
The adrenals, even after recovery, are generally weaker with each crash, regardless of the stage. The degree of weakness may not be significant to the sufferer in stage 1 or 2, but can generally be detected if careful attention is paid to the details of daily function. The signs, symptoms, intensity, and the nature of stressors are subjective in nature. What is considered intense for one person may not be for another. Many factors are involved, in addition to each body being different. Descriptions of crashes are therefore qualitative and not quantitative in nature. There is no precise way to accurately mathematically standardize each crash over a large and statistically significant sample base. Thus, forecasting total cycle time based on crash intensity is at best a clinical guesstimate and not an exact science. Adrenal Fatigue sufferers have a tendency to expect faster recovery time than usual because they are used to the same level of stressors producing a shorter cycle in the past. This expectation is often unrealistic. The understanding of this is critical to properly managing recovery expectations as well as the design of a comprehensive program because proper time needs to be allotted for the body to heal itself. It is not realistic to expect a stage 3C sufferer to have the short Recovery Phase of one that has stage 2 Adrenal Fatigue unless the former is under expert care. The dosage of nutrients used in stage 3C recovery is therefore necessarily different. One of the most common recovery mistakes is over administration of nutrients in those with advanced Adrenal Fatigue especially during crashes. This often leads to failed recovery and repeated crashes in a downward cascade resembling a waterfall. A good clinician with extensive experience is the key to navigate through adrenal crashes. A trial and error approach common of most self-navigation programs through this unchartered water can do more damage than good to the body.

By understanding this progression, we will be able to properly manage and match nutritional recommendations to the body’s physiological progression and needs.

**Adrenal Recovery Phase**

The Recovery Phase covers the time from the peak of the crash when the energy is lowest until such time the body returns to its immediate pre-crash level of adrenal function and energy level. Contrary to the crash phase, the Recovery Phase is harder to detect with clarity. Sometimes recovery is fast, but often it can be slow and laden with frequent setbacks. The more advanced the Adrenal Fatigue, the less possibility of a 100% recovery.

Under ideal or professionally managed conditions, the Recovery Phase is marked by multiple mini-cycles each consisting of three components: preparation, honeymoon, and plateau. Each mini-cycle can range from a few days to a few weeks. The weaker the adrenals, the more such mini-cycles are
needed and the longer each mini-cycle will last to return to pre-crash level of function. Such mini-cycle may also be a set-up for follow-up rolling crashes if not handled properly.

The successful recovery’s post-recovery energy is generally still below the level of pre-crash levels in most situations. It is not uncommon to have a second or third dip or setbacks during the entire recovery process. For some, there is a prolonged period of stabilization before the first recovery mini-cycle begins. This is very common especially in those with Adrenal Fatigue stage 3 or beyond. On the extreme, some do not recover at all but instead progress to the next crash after a period of stabilization.

Overtime however, one can usually detect a definite Recovery Phase following each major crash phase if one pays careful attention to the swings. Compare to an easy-to-track-down leg of the adrenal crash, the recovery curve can be flat with only minor improvements. The more severe the adrenal crash and the weaker the adrenals, the more difficult it is to spot this. The following figure shows the various recovery curves possible.

Curve A represents a normal recovery with many mini-recovery cycles along with inevitable setbacks, but a gradual up trend in adrenal function.

Curve B represents an accelerated recovery occurring usually in those with early stages Adrenal Fatigue (stage 1 and 2), or those with very strong constitution. This curve is also associated with those who are able to go from the crash phase to honeymoon period directly, usually under professional guidance. This is the most desirable curve.
Curve C represents a prolonged stabilization period and delayed recovery common in those with Adrenal Exhaustion (stage 3).

Curve D presents a failed recovery after a moderate stabilization period with progression to a subsequent adrenal crash common in those with weak constitution and adrenal exhaustion. This is the least desirable.

All four types of recovery curve are possible in any stage of Adrenal Fatigue, though the delayed and failed curve is more prominent in the more advanced stages of adrenal weakness as well as those with weak constitution.

Stage 1 and 2 Adrenal Fatigue as well as those under optimized recovery programs are frequently associated with recovery curves resembling curves A and B, regardless of constitution. Stage 3, stage 4, weak constitution, and self-guided recovery programs are more associated with curves C and D. It is extremely rare for an Adrenal Fatigue stage 3 to exhibit recovery following that of curves B unless under proper guidance. In fact, the natural progression for stage 3 Adrenal Fatigue is slow decompensation, following curve D if nothing is done or if over-zealous programs are administered by inexperienced hands. Those with a strong constitution and professionally managed are the ones with the highest likelihood to achieve a recovery curve similar to curve B.

Unless the adrenal glands are given the proper tools and nurtured back to health naturally (preferably professionally), most recoveries are eventually followed by subsequent worsening crashes as the natural progression of this condition.

**Common Signs of Adrenal Recovery**

Signs of adrenal recovery are usually less prominent and more insidious. They include:

- The many symptoms of adrenal crash appearing to be stabilizing and not getting worse.
- A sense of calm returning and feeling a better ability to deal with stress.
- Anxiety has reduced.
- Sense of hypoglycemic is reducing.
- More energy to do things that are not possible during a crash, such as washing dishes or gardening.
- Improving sleep, though it may not be perfect.
- Less salt craving.
- Temporary worsening of estrogen dominance, PMS, and menstrual cycle irregularity.
- Temporary rejection of nutritional supplements that has been beneficial.
- Sudden positive and exaggerated response to nutrients to be followed by negative response.
- Dreams during sleep that were previously absent.
Return of menstrual period, PMS, and ovulation pain.

It is important to note that stabilization is part of the recovery process as mentioned above. In other words, if the symptoms of crash are not worsening, the body is likely in the transition from crash to recovery and in stabilization portion of the Recovery Phase.

**Recovery Management**

The main focus of recovery is quite different from that of an adrenal crash because the total recovery process is usually complicated and drawn out. While the adrenal crash phase usually takes a few hours to a few days to complete its course, the complete recovery phase can take weeks and sometimes months. Those with weak constitutions are especially vulnerable to an overall delayed recovery phase. **The main focus of adrenal crash management is to reduce crash intensity and duration.** An analogy would be like quickly assembling a safety net to catch a falling person in order to soften the harsh landing. **The main focus of recovery management is to provide the body with enough tools for it to heal itself even though it might take a long time.** Adrenal recovery management is like leading a blind man across a stream. The motto is to go slowly and gently, one foot at a time. One foot is always ahead trying to feel where and how secure the next rock is before actually put the body weight on it. That is how one avoids falling into the water, or in the case of adrenal recovery, crashing.

Think of the recovery process as running a long distance race instead of a sprint. You need first to be strong enough to get up, start, and finish the race. That requires systematic planning, training, and budget for setbacks. At first you may only be able to finish by walking. Slowly you improve and start working out the speed. Most successful running programs stress a gradual and systematic approach, with intermittent challenge runs along the way as a gauge of your body's reserve and energy level.

The body is not a light switch that can be turned on and off at will. Adrenal Fatigue that takes years to develop should be given ample time to heal itself. **A common mistake in recovery management is to focus on a speedy recovery, which sacrifices the more important concept of rebuilding the underlying reserve.** Pushing the body ahead of its readiness is a recipe for crashes and ultimately recovery failure.

A successful recovery management program incorporates the following factors:

- **Proper stabilization immediately after an adrenal crash.** After a crash has occurred, the body needs a period of stabilization. **Unless the earlier described crash-to-honeymoon transition is affected, the body should be allowed time to calm down and stabilize.** Emergency systems triggered during the crash need to be de-activated by reducing the frequency of alarm signals. This is best accomplished by adjusting diet, lifestyle,
and nutritional supplementation to match the functional level of the adrenal system. As the body stabilizes, paradoxical reactions gradually resolve and the low clearance state improves. As a result, follow up crashes are less easily triggered.

- **Prepare the body for the honeymoon period.** After the body has been stabilized, a thorough examination of the various dysfunctional systems is conducted. The systems with the most prominent dysregulation should be addressed first. For example, those who have Ovarian-Adrenal-Thyroid Axis Imbalance (OATS) may be thyroid dominant. Their primary symptoms are more related to thyroid dysfunction than ovarian or adrenal irregularity. Symptoms of hypothyroidism such as sluggishness, weight gain, and dry skin are more severe compared to ovarian hormone dysfunction symptoms such as PMS and menstrual irregularities. Similarly, some may have dominant adrenals, prominent sympathetic symptoms, and adrenaline rushes. They are "wired and tired", a symptom of autonomic nervous system imbalance. Focus should be placed on identifying and prioritizing the system to heal first during the preparation period. As much as possible, the priority is to help the body heal the most damaged system. The total recovery process is only as strong as the weakest link. In the examples above, more emphasis should be placed on fortifying the thyroid and the adrenals respectively as long as the body can tolerate it.

Knowing which is the most dysregulated system and understanding how to prioritize is a clinical skill that requires a thorough patient history and a good understanding of the underlying body physiology. The usual clinical presentation in an adrenal crash and its immediate aftermath is confusing and convoluted. Fatigue can be so overwhelming that one is misled into focusing only on regaining energy instead of fixing the underlying picture. The temptation is to fix the symptom that is most complained about; most of the time, that is usually fatigue. Although it might help in the short term, it does not help identify the weakest link. A low energy state can be the result of low blood sugar or electrolyte imbalance, for example. These point to two quite different root causes. Low blood sugar points to metabolic dysregulation, while electrolyte imbalance can point to aldosterone insufficiency. Simply boosting energy without attending to the root dysfunction is not going to help the adrenal recover over time.

The smoke needs to be separated from the fire to clearly identify the root and dominant cause. In the case of dealing with fatigue mentioned above, here are some further considerations. Morning fatigue is usually an indication of peaked-out cortisol output. Late morning fatigue is usually a sign of cortisol mal-adaptation rather than output. Late afternoon fatigue is usually due to sugar and metabolic imbalances. Evening fatigue is suggestive of baseline cortisol inadequacy. Fatigue is but an end result. It is therefore of paramount importance to take a detailed history and follow the symptoms to the root cause to avoid prescribing the wrong therapy.
Many with fatigue also concurrently complain of insomnia. Sleep onset insomnia (inability to fall asleep) can be indicative of sympathetic overtone or excessive cortisol. Sleep maintenance insomnia (waking up in the middle of the night) usually points to some form of metabolic dysregulation in addition to cortisol regulation issues. Because most people present multiple symptoms, the clinical picture can be very convoluted and confusing. If one presents good morning energy but late afternoon fatigue, focus should be placed on normalizing the afternoon low by modulating blood sugar level as a priority rather than simply administering steroid or stimulating compounds to prop up the energy level at that time. Without proper normalization, the body will be struggling every day to maintain homeostasis. It will not have enough reserve left to rebuild itself. It is unlikely able to enter the honeymoon phase with vigor and recovery will be delayed or failed.

- Take properly dosed nutrients to match adrenal function for recovery. The judicious use of nutritional supplements based and their continuous adjustments throughout the recovery phase is a key component to any successful program. As the body condition changes, the dosage, delivery system and timing of nutrients need to be changed in order to give the body maximum support without triggering crashes. There may be a prolonged period of stabilization without significant improvement, or there may be a time where the body tends to reset and behave erratically to supplement what was helpful before. Sometimes the resetting period may be accompanied by unexpected sudden exaggerated and positive responses. Learning to identify this resetting time and taking advantage of it by titrating nutrient dosage is more of an art and not a science. It requires extensive experience and will be discussed below in more detail.

- Planned rest after each incremental improvement. The adrenal recovery curve is not a linear event with straight up improvements, but a step-up progression. The goal of a successful recovery program is to elicit small incremental and steady improvements resembling multiple stair steps going up over time without crashes. While nutrients are used to affect a higher energy state and repair previously dysfunctional systems, they can also take a toll on the body during the repair process.

Recovery is a stressful process as far as the body is concerned. This important point is often missed. Energy is needed to process nutrients as well as to metabolize breakdown products so that it can be excreted from the body without toxic building up. Energy is expanded to absorb and process good nutrients. This can be taxing to the body over time. After each incremental improvement, time needs to be allotted for the body to rest and regroup to get ready for the next climb up. Making a conscious effort to force the body to rest in order to build up its healing reserve is a sign of clinical excellence. It is important to allow the body rest, as this is one of the best ways to reduce risk of follow up crashes.

- Qualitative challenges to measure adrenal function at any point in time. Due to the lack of quantitative laboratory tests, a battery of qualitative challenges are used continually
to assess the body's internal function and reserve during the entire recovery process. The response to such challenges will signal the adrenal's reserve capacity, state of clearance, nutrient tolerance, and capability to recover. Results of these challenges will help the clinician formulate the right dosage, delivery system, timing and intensity of nutrients, dietary recommendations, lifestyle modifications, and exercise programs. Challenges are therefore, a very important part of the overall recovery strategy planning process. We shall discuss this in greater detail below.

- Prevent follow-up crashes that can set back the internal homeostasis. One of the hallmarks of successful recovery is the lack of follow up crashes. Each adrenal crash is undesirable, as it requires many more times the energy to recover. Those with advance Adrenal Fatigue or weak constitutions simply cannot afford any crashes at all. The worse recovery pattern possible is the fast recovery followed by many rolling crashes. Avoidance of crashes is the primary goal of any good recovery management. This can be achieved by giving the body extra supports so that its marginal reserve is increased. This conscious prioritization is important. Speed of recovery takes a second seat compared to the assurance of steady recovery. The weaker the constitution and the more advanced the stage of adrenals are, the more important this becomes. The key to balancing the increase of energy to avoid follow-up crashes rests largely on the dosage and delivery system of nutrients. Too big a dose can increase the energy and recovery speed, but it carries a higher risk of adrenal crash as the body can be compromised. Multiple crashes over time are a sign of poor recovery and should be avoided at all cost.

- Prepare a set of tools to prevent, abort, or soften future crashes. Not all nutrients are treated the same way by the body. Certain ones are gentler, and others are harsher. The adrenal recovery nutritional toolbox should have a good mix of all. The strong ones need to be identified, and used sparingly. Gentle nutrients can be used more frequently. For example, DHEA is generally more stimulatory than pregnenolone. Its use should therefore be reserved for emergency situations such as crashes rather than used on a routine basis in the day-to-day normal recovery process. Identifying such nutrients and saving it for a rainy day is a sign of clinical excellence. As part of the adrenal crash management toolbox, these nutrients are deployed once an unavoidable crash happens.

Failure to consider all the above factors is a common reason why most recovery programs fail. Recovery management must be taken seriously if the goal is full recovery. What is commonly forgotten is that Adrenal Fatigue, if left to itself, progresses negatively with aging. Invariably, crashes will resurface again with time, and fatigue will advance if the previous healing process is incomplete. Those who tend to ignore the importance of recovery management during early stages usually become overly confident in self-management from previous successful efforts. This is compounded by the fact that the majority of conventional physicians are of little help. The tendency is then to continue to self-navigate using the same concept that worked before. This usually involves rest, use of stimulatory compounds, and medications to suppress symptoms. Sad to say that this strategy often backfires in those with advanced Adrenal Fatigue.
Proper recovery management is far more complicated than what meets the eye, especially for those in advance Adrenal Fatigue. The weaker the adrenal function, the more critical proper recovery management becomes. Patience is also required as many challenges, trials and errors are inevitable even in the best of hands. During a crash, the proper type of food and nutrients ingested becomes critical. Let us take a closer look.

**Simple Food for a Simple Body**

A body in severe down-regulation during adrenal crash is only interested in basic energy input that it can use effectively without expending a lot of energy to get it. It will simply reject everything else. Since energy comes from food, this means that the food we take in must be easy to digest, assimilate, bought into the cell, and convert into energy quickly without a lot of energy expenditure. Think of an infant. For the first few months after birth, an infant's full nutritional needs can be met by taking in mother's milk alone. That is all baby requires at that point when the gastric intestinal tract has yet to be fully developed. Months later, food can slowly be introduced, one step at a time. This gradual process delivers nutrients to the system that matches the body's digestive apparatus maturation. Any attempt to give solid or whole food, or even worse, processed food, to a baby too soon will lead to vomiting and indigestion. The body will reject food, even thought it is nutritious, if it is before its time.

In advanced Adrenal Fatigue or during adrenal crashes, the body is returning to a simple state. The weaker the adrenals, the less the body is able to tolerate complex and processed foods as it simply does not have the energy to divest to break down these complex foods. Wheat, gluten, and diary products are particularly problematic as these are more difficult to digest. Increasing bowl irritation (with symptoms such as constipation or diarrhea), bloating, delayed food sensitivity, and gas are signs that the gastro intestinal tract is compromised and the body taxed. Vomiting may ensue if we continue to ignore the body's signals asking us to simplify our food or reduce the quantity. Those with advanced Adrenal Fatigue therefore will often find it necessary to reduce the complexity of food intake. They may have to be pureed to be absorbed.

Those with extreme Adrenal Fatigue need nutrition at the most basic level-rich in nutrient and easy to digest. This means food usually in liquid form. These include raw colostrum, raw milk, raw egg, chicken broth, and rice porridge. The amount needs adjustment to match the body’s ability to absorb. Some can only take a few teaspoons at a time and need significant rest in between.

**Simple Nutrients for a Simple Body**

As the body returns to simplicity during a crash, nutritional supplementation considerations also need adjustment to the most basic kinds and those that are most bioavailable at the cellular
level. **Complex nutrients are of little use when the body is unable to break it down into proper components for proper absorption and cellular delivery.** One must avoid nutritional supplements that are complex, including certain herbs. Glandular can also be problematic due to intrinsic low clearance of the body that usually comes with advance adrenal weakness.

**The volume of supplements also requires adjustment. Over-supplementation is a common mistake.** Many advanced Adrenal Fatigue sufferers are taking a basket of nutritional supplements to sustain their energy level. This approach is risky. **Unless properly titrated, unmonitored intake of complex or stimulatory compounds to enhance energy flow usually ends badly.** This becomes worse when a nutrient that has positive effect early on can turn negative as Adrenal Fatigue worsens. This accounts for the many paradoxical reactions we see.

**All supplements must be carefully selected.** Nutrients not properly matched to the body's requirement at any stage are a sure recipe for failure. After reaching maximum stimulatory levels, it is usually only a matter of time before the body crashes. Supplements, no matter how beneficial, are only as good as the body's ability to absorb and process. A weak body has limited energy to digest nutrient and thus is not able to garner the beneficial effect of the supplement as a result of poor absorption. Furthermore, **energy used to digest supplements can further drain the body of its already low reserve if too many supplements are taken in a day. More nutrients at a time when the body is crashing or down-regulating are therefore not necessarily better. It may have worked before when the body's reserves were large.** In a weak body heading towards simplicity, this strategy can backfire. A personalized nutrient program is necessary, using only a few nutrients most needed by the body. These have to be absorbed through the gastro-intestinal tract in a most energy neutral manner, and made bio-available to each cell in the most efficient manner.

**Understanding the concept of having nutrient type and dosage match the body's need in every stage is key before one can plan a proper recovery program.** Knowing the body's unique nutrient history is therefore a critical component in tailoring the right dose and the proper delivery system to affect maximum healing.

**Only the most basic nutrient most needed by the body should be used when the body is vulnerable. Undesirable supplements should be terminated gradually. Abrupt cessation should be avoided and care must be taken to avoid any rebound or withdrawal effect.**

In addition to selecting the right supplement, micronutrient delivery to the cell is also a key factor. **Tablets need restraint, due to high content of binders and fillers. Powder high in sugar is likewise something to avoid. Liquids are best, but only if the proper delivery system is employed. Use various forms of the same nutrients to affect maximum bioavailability because each form has its own unique characteristic in terms of potency, half-life, absorption, and breakdown curve. A custom blend and mixture using various forms can have potent synergistic effects well above any single form of the nutrient.**
The take home lesson is that nutrient is only good when it matches the body's ability to absorb. A normal body has plenty of reserve to take in complex and processed food without difficulty. The Adrenal Fatigue body is very different. It is a body trying to return to simplicity. This requires simple food and simple nutrients delivered properly for maximum benefit.

Fortunately, if one takes proper action using natural compounds and proper nutrition the adrenal crash is not permanent. The body possesses self-healing powers if the right tools are available. Over time, a weak adrenal can strengthen. As this happen, fatigue subsides and energy returns. Adrenal Fatigue is therefore reversible, and recovery possible. As the Adrenal Fatigue heals and health improves, other foods can once again be ingested, normal stress tolerated, and normal life activities can resume.

Having looked at the entire recovery management process as a whole, we now turn to specific areas where special attention is required.

**Stabilization / Plateau Period**

Many are discouraged when there is no immediate restoration of energy level after a crash and become impatient. Many equate adrenal function to energy level. Many feel, after a short time, that they are simply going nowhere and "treading water" as if there were no continuous increase in energy level. This time is commonly referred to as the stabilization period if it follows a crash, and plateau period if it immediately follows a recovery cycle.

Remember that the adrenals secrete over 50 different hormones that affect all parts of the body. Some hormones act quickly, while others take some time. Energy is important, but is not the only parameter of recovery. Those who are impatient or narrow-minded often resort to the use of stimulatory compounds or medications to produce a faster energy response. This approach is dangerous and has a higher chance of backfiring down the road. Energy needs to be properly modulated to be able to work harmoniously with the rest of the body and work. Too much energy without proper counter-balances will eventually lead to an overall weaker state of adrenal function. One can end up being energized (wired) and tired at the same time, a classic characteristic of advance Adrenal Exhaustion. A critical part of proper adrenal recovery is nurturing the adrenals back to a balanced state of function in order to minimize subsequent crashes during this time.

After a major crash, the body often needs a period of stabilization prior to beginning the first recovery mini-cycle up. This first leg up is the most difficult because the body is weakest at this time. An aggressive approach to stimulate the adrenals towards a fast recovery at this time can backfire and is one of the common recovery mistakes seen in self-navigation programs. The body needs time to regroup and reset itself. This may take weeks in those with advance Adrenal Fatigue (Stage 3 and 4). Pushing the body when it is not ready is a recipe for failure.
Allowing the body time to stabilize and using this time wisely to prepare the body with gentle nurturing nutrients is a sign of clinical excellence. With this approach, a strong foundation is set as the adrenal reserve is being rebuilt. This ensures a steady recovery and minimizes the risk of subsequent crashes during the recovery process. Minor crashes may be unavoidable even under the best of hands, especially if the adrenals are constitutionally weak. Some of the subtle indications of an adrenal being rebuilt during the initial stabilization period are a gentle and gradual return of calmness to everyday life, a better ability to deal with stress, and reduced anxiety when stressors resurface. However on the surface, there may not be any significant improvement in energy level from day to day. Fatigue continues to be troublesome. Yet, one can look back and notice that crashes are more spaced out and sporadic, with less energy depletion when that happens, and there exists a sense of calmness even when stressors surface. For this reason, a well-utilized stabilization period is the most important part of the overall Recovery Phase.

The worse recovery scenario possible is when someone recovers quickly only to be followed by more crashes that spiral down over time. This cascading waterfall must be avoided at all costs as it weakens the body with reduced chances of successful recovery with each crash. The risk of this can be minimized only if the adrenals have a chance to rebuild itself slowly and steadily under proper guidance, and the best time to successfully accomplish this is during the initial stabilization period of the Recovery Phase and the subsequent plateau period of each mini-recovery cycle.

After each mini-recovery cycle up, there is a plateau period as well. This is similar to the stabilization period; except that it only happens after the honeymoon period and not after an adrenal crash. Allowing the body to rest during the plateau is important. After rest and consolidation of energy at this level, the body will be ready for the preparation period to get ready for the next honeymoon period of adrenal recovery. Not allowing the body to go through a plateau phase by pushing the body with undue exertion, stress, aggressive medications and nutritional supplements will often increase the risk of subsequent crashes.

**Resetting State**

Often times during the Recovery Phase, the body may go through a period where it tries to reset and kick-start itself for reasons that are not well understood. Perhaps it is nature’s last resort of trying to help itself when all else fails. During a crash, the body often goes into an emergency mode. This resetting may be part of the delayed survival mechanism that is activated automatically. The timing of this resetting varies from person to person if it does occur. During the resetting, the body suddenly behaves differently for no apparent reason. For example, certain nutrients that have been helpful before may suddenly be rejected. Nutrients may also have a sudden positive exaggerated response only to be followed by a negative response. This is a turbulent time for the body where most sufferers are discouraged and do not understand what to do.
next. The resetting state usually occurs sometime during the late initial stabilization period, late in plateau period, or sometime during the preparation period during subsequent mini-recovery cycles.

Few pay attention to, or are on alert for, this event when it happens. Even fewer are attuned to the significance of this minor but important phenomenon that is clinically evident but seldom mentioned in any literature. This event may represent an opportunity to "kick-start" the system and bring it to a higher level of function. When properly taken advantage of, this "kick-start" process can propel the adrenals into the honeymoon period. Without taking advantage and using this to "kick-start" the system during the resetting state, one can stay stagnant in the preparation period for an extended period of time due to lack of impetus. This process is made possible by taking advantage of the natural body's recovery rhythm. The body appears to be telling us to stand aside and leave it alone during this resetting state. Most make the mistake of ignoring the body's signal. Instead of pushing more nutrients at a time when the body does not welcome them, it might be better to take a pause. Learning to listen to the body is often a wiser choice. After a pause to reset body, the same nutrients may be restarted and the body welcomes them with dramatic improvement. An astute clinician attuned to this will likely catch it as he or she is on constant alert waiting for this. Recognizing such a window of opportunity and taking the right action at the right time will greatly facilitate the body's progression to the honeymoon period that otherwise would elude the sufferer. This is a sign of clinical excellence.

Those who do not recognize this or miss this window of opportunity may have delayed recovery, or inadvertently make the condition worse by over-administering nutrients at a time when the body does not react well to them. A common mistake is to assume that nutrients are "not working" as fatigue levels seems to be getting worse, and that more is needed since those nutrients have worked previously.

### Qualitative Challenges

Quantitative challenges are routinely used in modern medicine to help the physician understand the functional level of a given organ system. The most common is the cardiac stress test for those who have chest pain. A person is placed on a treadmill to run while a machine measures cardiac function. By challenging the heart to work and observing its response, physicians are able to deduce the health of the heart and blockage of heart vessels. Endocrinologists routinely use ACTH challenge tests to assess adrenal function. Tilt-table tests are used to help diagnose those with dysautonomia. In the early days, these tests were all qualitative in nature. Thanks to extensive research, standardization and quantifiable results have become the norm, and with that, standardized protocols have become a reality. Unfortunately, such quantitative tests are not available when it comes to Adrenal Fatigue. We resort to using qualitative challenges, which is less sophisticated and more subjective, but nevertheless still valuable.

Qualitative challenges are subjective assessments tools designed to assess specific functional statuses of the body's internal systems. Results are based on the subject's personal
experience rather than a quantifiable numeric number. These challenges are used to give the clinician a better sense of the body's internal function with the lack of accurate, sensitive and clinically well-correlated laboratory studies. **Because of its subjective nature, there is a high potential for bias and inaccuracies.**

A qualitative challenge used in Adrenal Fatigue commonly involves purposely-designed adjustments of nutrients such as vitamins and minerals, dietary components such as protein and carbohydrates; exercise such as aerobics or weights; lifestyle factors such as sleep habits are used to test the body's response, both positively and negatively. For example, a sodium challenge involves taking a measured bolus of salt rather than just salting food more. Its purpose is not to quench the existing salt craving only. The body’s response to the sodium challenge indirectly tells us the status of fluid and electrolyte balance. Because sodium regulation is tied to the hormone aldosterone, the body's response to the sodium challenge gives us a good idea of its aldosterone function. Since aldosterone is a hormone made in the adrenal glands, we also have a better sense of adrenal function. **This is therefore a rough and indirect way of assessing adrenal function.** In academic medicine, this may be considered crude and unsophisticated. However, this method is a great and simple tool for analyzing Adrenal Fatigue. Sometimes, simple challenges can sometimes yield far better insight than any laboratory test.

**Positive as well as negative responses, when carried out under professional guidance, serve as indicators of reserve a system has for that particular function.** In the case of the sodium challenge, for example, a body in need of sodium (salt) will respond very positively with increased energy when salt is taken. A body that is overloaded may respond negatively with nausea and vomiting. A body with circulation and heart problems might lead to higher blood pressure or edema. A body that needs more sodium but are unable to balance fluid might respond with a mixed picture. An astute clinician will be able to use these qualitative results as a clinical guide to formulate a proper recovery program for that single item - sodium.

Salt craving is also used as a monitoring tool. As Adrenal Fatigue improves, salt craving usually reduces. Salt therefore serves multiple roles. It has challenge, therapeutic, and monitoring roles. Knowing how to use this single compound properly can give us a good sense of where the body stands not only as it relates to this one nutrient, but also on how it can relate to other nutrients as well. For example, sodium is tied to water, and is inversely tied to potassium. Knowing sodium tolerance will give us information about how to manage potential fluid and potassium imbalances as well. This can be far more insightful than any laboratory test.

**Challenges using different nutrients are deployed continually during the recovery phase to assess the effectiveness of current therapeutic agents, test the reaction to possible new agents prior to starting, and assess the clearance state.** Continually using challenges to feel the path is like having a walking stick in hand to have a better assessment of what lies ahead prior to
even putting your foot on the next rock. It makes the recovery process more pleasant, smooth and safe.

**Nutrient Challenges**

Generally, challenges involve the use of nutritional supplements, as their results are easily evident in most cases if done right. Challenges are generally divided into four broad categories:

- **Bolus Challenges** involve significant introduction of single or host of nutrients designed to elicit specific positive or negative responses.
- **Step Up challenges** involving gradual increase of a single or host of nutrients designed to elicit specific positive or negative response.
- **Step Down challenges** involve gradual decrease of a single or host of nutrients designed to see how the body reacts with reduced nutrients concerned.
- **Elimination challenges** involve purposeful elimination of previously beneficial or neutral nutrients to see how the body reacts without such nutrient for a short period of time.

It is very important not to equate a positive outcome of a challenge as the only way to a successful challenge. In certain cases, one might be looking for a negative response. In other words, not all challenges need to be positive in order to be a successful challenge. A **successful challenge is one that elicits a certain response from the body that leads us to draw certain conclusions and thus a better formulation of the overall recovery plan**. For example, a neutral response and absence of diarrhea when large doses of magnesium are administered would mean that body has yet to reach bowel tolerance level (BTL). If we wish to know the BTL, we want to elicit a negative response. In this case, we increase the magnesium load until diarrhea is experienced. Positive and negative results are closely monitored with respect to each specific nutrient relative to the challenge taken. The onset of anxiety and fatigue when DHEA is administered may indicate a low clearance state. A sense of a morning hangover after a melatonin challenge the night before may indicate circadian dysfunction or overload.

**Almost any nutrient can be used as a challenge substrate. Prior to commencing any nutrient challenge, one should have an idea of the body’s previous nutrient reaction history.** For example, let us say a person has taken ascorbic acid before at 1000 mg without adverse effect. This neutral history serves to qualify ascorbic acid as a potential nutrient that can be used if it is selected to be part of the challenge toolbox. Those who cannot tolerate ascorbic acid because of gastric irritation, for example, will preclude the use of this nutrient as a challenge substrate. **Challenges should not be started with a compound that was not previously exposed to the body due to the risk of possible negative reactions.** A scaled approach is best if the body is constitutionally weak or low in clearance. For example, most people develop diarrhea when BTL is reached with high dose oral ascorbic acid. Because the BTL varies from person to person, one should start off
with low doses and scale up accordingly. To use this nutrient at a dose above the BTL in the beginning would not yield any results other than diarrhea.

The many different forms of nutrients can also have its unique challenge characteristics. In the example above, ascorbic acid tends to be fast acting and "spiky". Its use as a challenge substrate is best when it is desirous to know how the adrenals react to clear compounds that are stimulatory. Fat-soluble vitamin C, due to its more gentle and slower absorption characteristics, for example, would not be a good substrate to use for this purpose. It is, however, an excellent challenge if one wants to study the effect of vitamin C in a body that is highly sensitive to regular ascorbic acid.

The identification of the possible pool of qualified nutrients therefore, depends on the history as well as from actual use of the nutrient in the clinical setting scaled to match the body's tolerance. A careful and detailed nutrient reaction history can serve as a good guide to start. Many with Adrenal Fatigue are already on a battery of natural compounds. Careful evaluation of these compounds on an individual basis can help to contribute to the entire selection process.

The list of challenge substrates is vast and varied. Every natural compound has its unique characteristics and use. Having a detail physiological understanding of each of these compounds is a key prerequisite prior to starting any nutrient challenge. An astute and experienced clinician is the key to this process due to the subtle differences among natural compounds that are not easy to detect.

Here are some nutrients and their possible uses as challenge substrates:

![Signs and Symptoms: Adrenal Fatigue vs. Low Thyroid Function](image)
- Vitamin C can be used to evaluate clearance state and adrenal function.
- Evening primrose oil can be used to evaluate estrogenic function.
- Glutathione can be used to evaluate nutrient recycling capability.
- DHEA can be used to evaluate androgen hormone function.
- Progesterone can be used to evaluate internal biosis.
- Taurine can be used to evaluate thyroid function.
- Tyrosine can be used to evaluate neurotransmitter function.
- Pregnenolone can be used to evaluate the cortisol synthesis pathway in the adrenal glands.

The dose necessary for a successful challenge varies greatly from nutrient to nutrient as well as from person to person. In the case of vitamin C, some can experience significant responses with as little as 10 mg, while others will need well over 10,000 mg. In addition to dosage, the delivery system has to be considered. Different forms of the same substrate also have different properties. Liquid form may be more desirable in certain situations as they tend to be absorbed faster into the bloodstream. Topical forms of delivery system are particularly important when it comes to those who are highly sensitive.

It is also important to note that previously intolerable substrates may be reintroduced later again as a challenged nutrient and used as a yardstick of the recovery process. This tolerance challenge is clinically very useful.

It is very important to remember that while nutrients designed to be used during the challenge process may have positive therapeutic value, many nutrients are not suitable for long-term therapeutic use for a wide variety of reasons. For example, DHEA used during a challenge may help increase energy and reduce fatigue. Some will continue to use DHEA for a long period of time in order to have this energizing effect. However, long-term use may lead to excessive hair loss and acne as well due to the possible androgenic effect. Extrapolating a positive therapeutic outcome from the use of a challenge substrate into long-term use can be a major mistake.

System Specific Challenges

Challenges can also be designed to assess and target specific systems. Each protocol is designed to assess the functional level of a body system. They involve the use of nutrients, dietary input, and lifestyle adjustments in combinations. Here are some examples:

Metabolic system may be assessed by way of carbohydrate or protein challenge. For example, taking more protein before bedtime can point to the body's metabolic state in the middle of the night when blood sugar level may be low. The response will point to the body's ability to process glucose. This can also be very useful in assessing those with metabolic syndrome, insulin resistance, hypoglycemia, or sleep maintenance insomnia.
Sympathetic nervous system function may be assessed by a forced deep breathing challenge or nutrients such as tyrosine and selected herbs. The response will point to the body's response to sympathetic overtone and its adrenaline state.

Ingesting hard-to-digest-proteins and its assimilation may assess the gastro-intestinal system. DHEA, glutamine, and magnesium are also valuable in assessing issues of irritable bowel and leaky gut. Due to the complicity and potential of negative and sometimes unpredictable responses, all challenges should be done only under experienced professional guidance in a controlled environment. Improper challenges can trigger adrenal crash and make Adrenal Fatigue worse.

With proper qualitative challenges, the clinician can gain valuable insights far beyond any laboratory test. This facilitates the formulation of a good recovery management program customized to the body's needs.

### Duration of Adrenal Recovery Phase and Recovery Factor (RF)

One key question remains - how long does the recovery take?

The duration of the Recovery Phase varies as it is dependent of the Adrenal Fatigue stage. The more advanced the Adrenal Fatigue stage, the longer will be the Recovery Phase.

Recovery factor (RF) is a quantitative measurement of the Recovery Phase duration relative to crash phase duration. This helps us to appreciate the time it takes for recovery vs. the time of the crash. RF is a numerical number derived by dividing the recovery time by the crash time. If the crash duration is 1 day and the subsequent recovery duration to return to immediate pre-crash baseline is 4 days, then RF = 4/1 = 4. In other words, it takes the body four times longer to recover relative to crash. The higher the RF number, the more depleted the adrenal reserve and the weaker the adrenal glands. RF ranges from 1-20, with the lowest number in stage 1 and the highest number in stage 4. RF gives us a rough measurement of one's adrenal function.

The RF number can vary due to tremendous individual variation. Note that as Adrenal Fatigue stage progresses, the average RF increases. The average RF for stage 2 is 2, while the average RF for stage 3C is 7. The RF range also increases. The RF range for stage two varies from 1 to 3, or a 3 fold range. The RF range for someone in stage 3D can range from 6 to 30, a 5 fold increase. Those at stage 3D can expect a recovery time of 30 times or longer compared to stage 1 Adrenal Fatigue. The weaker the adrenals, the wider the range with a bias towards slower and less than optimal recovery. It is rare to see anyone with RF of 3 in stage 3D Adrenal Fatigue unless under professional guidance. It is common for most in stage 3D to have RF from 6 to 30.
Another way to look at this: those in stage 1 Adrenal Fatigue can expect to spend 50% of the total cycle in crash and Recovery Phase each. As Adrenal Fatigue worsens, one can expect to spend a proportionally longer period of time in Recovery Phase relative to crash phase. A typical stage 3C sufferer can expect to spend about 13% of the total cycle time in the crash phase and 87% of the time in Recovery Phase. The following table depicts a summary of clinical observations. Each number represents a unit in time, usually day(s).

<table>
<thead>
<tr>
<th>Adrenal Fatigue Stage</th>
<th>Average Days of Adrenal Crash</th>
<th>Average Days it Takes to Recover</th>
<th>Ave. Total Cycle Time</th>
<th>Average Recovery Factor</th>
<th>Crash Time as % of Total Cycle</th>
<th>Recovery Time as % of Total Cycle</th>
<th>Recovery Factor Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>50</td>
<td>50</td>
<td>1 to 2</td>
</tr>
<tr>
<td>2</td>
<td>1.35</td>
<td>2.5</td>
<td>4</td>
<td>2</td>
<td>33</td>
<td>66</td>
<td>1 to 3</td>
</tr>
<tr>
<td>3A</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>25</td>
<td>75</td>
<td>2 to 6</td>
</tr>
<tr>
<td>3B</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>4</td>
<td>20</td>
<td>80</td>
<td>3 to 7</td>
</tr>
<tr>
<td>3C</td>
<td>2</td>
<td>14</td>
<td>16</td>
<td>7</td>
<td>13</td>
<td>87</td>
<td>4 to 10</td>
</tr>
<tr>
<td>3D</td>
<td>2</td>
<td>24</td>
<td>26</td>
<td>12</td>
<td>8</td>
<td>92</td>
<td>6 to 30</td>
</tr>
</tbody>
</table>

In absolute terms, the RF increases greatly in Stage 3C as this is where the greatest functional decline occurs. The RF increases by 43% from Stage 3B to 3C vs. an increase of 33% from Stage 3A to 3B. This bias continues to be carried onward as one enters Stage 3D from 3C. It comes as no surprise that those in Stage 3D spend 92% of their time in recovery and only 8% in crash on average. It is therefore imperative that those with advance Adrenal Fatigue avoid crashes as much as possible.

**Successful and Failed Crash and Recovery Cycle**

The following graphs depict what a successful and a failed recovery program should look like.
Line A shows a normal crash of average intensity followed by a typical prolonged recovery time common in Adrenal Fatigue stage 3C. There are frequent setbacks during a slow and steady recovery.

Line B shows the same crash but under optimal recovery conditions. Such a recovery program does not guarantee a total absence of a crash. Intermittent crashes are unavoidable. A successful program, usually under experienced professional guidance, allows the sufferer a learning experience on how to recognize a crash before it comes, make available ahead of time customized tools so that if a crash does occur due to circumstances beyond control, there is immediate deployment of such tools to effect a slower and lower intensity crash. The goal is a less symptomatic crash, a "soft-landing". Some unpleasantness may be unavoidable, but the symptoms will be under control and manageable with no panic. The risk of rolling into another crash is minimized. It is not unusual to have a drastic reduction in crash frequency and symptoms if properly managed professionally. A successful program will also allow the sufferer to effect a much faster Recovery Phase and thus an overall shorter total cycle time. The shorter the cycle, the less unpleasantness and fatigue.

Line C this represents a failed program. Unfortunately most self-navigation programs fall into this category, especially for those with advanced Adrenal Fatigue or weak constitution. After the adrenal crash, recovery may appear to progress well. This is often due to administration of stimulatory compounds that include medications, herbs and glandular to sustain unrealistic adrenal function at a time when the adrenals needs to be nurtured with a carefully customized program specific for the body's need. Programs using stimulatory compounds (natural or prescription) may
lead to outcome that appears to improve for a short time. The unsuspected sufferer is mislead into thinking that the right recovery path has been chosen. This false sense of improvement eventually fades as symptoms not only return but also become worse, resulting in a more severe second crash as the body cannot handle prolonged stimulation. This second crash often leads to a lower state of adrenal function below that of previous crash, setting a new low. This downward cascade is repeated far too often, and with each failure, the body becomes weaker. These crashes propel the body into advanced stages of Adrenal Fatigue that could have been avoided if a good recovery program has been followed early on.

Adrenal Exhaustion Recovery Patterns

While recovery phases of stage 1 and 2 Adrenal Fatigue are relatively uneventful, those in Stage 3 Adrenal Fatigue (Adrenal Exhaustion) usually find recovery very challenging. The body's intrinsic constitution plays a big role in determining the Recovery Phase outcome. The more advanced the Adrenal Fatigue, the more varied is the recovery pattern. This is especially true of those in stage 3C or 4 Adrenal Fatigue. Those who have strong adrenal constitution do recover faster and the recovery is sustained when compared to those who have weak adrenals. Those with very weak constitution and severe stress may suffer crashes and never fully recover but continue going downward in a path of decompensation. There is no laboratory test to forecast the body's constitution. Knowing whether you have a strong, normal or weak body constitution plays an important role in Adrenal Fatigue recovery planning because the pattern of recovery and the kind of nutrients required differ depending on the type of body constitution. The more advanced the Adrenal Fatigue, the more important the body constitution plays a role in determining the ultimate natural progression of the condition.

The following depicts how the body's intrinsic adrenal constitution affects the recovery pattern in people suffering from stage 3C Adrenal Fatigue:
No where is it more important to study the recovery pattern than in Adrenal Fatigue Stage 3, especially Phase C because of the variety of possible recovery outcome. The natural progression for those with normal constitution is one of slow deterioration over a period of time (Pattern 5). However, the time can be lengthened if the intrinsic body constitution is strong (Pattern 6). The goal is to extend the time as long as possible and the deterioration pattern to be slowed as much as possible. This is best achieved by a personalized recovery program (Pattern 7). Those with very weak constitution tend to fair worse (Pattern 1).

Unfortunately, excessive and inappropriate use of natural stimulatory compounds commonly employed by those who are in self-navigating mode (Pattern 3), as well as the aggressive use of prescription medications (Pattern 4), often worsen the final outcome of many Adrenal Exhaustion recovery cases. Eventually, this will push the sufferer into adrenal failure far earlier than if nothing is being done and let nature takes its course (Pattern 5). In other words, matters are often made even worse.

Fortunately, regardless of which recovery pattern is being followed, the body is generally forgiving. The key is to mimic the recovery curve as close as possible to Pattern 7. With the right professional help, the body's damage can often be reversed and nurtured back to health.

The following table summarizes the above discussion:
Importance of Understanding the Adrenal Crash and Recovery Cycle

It is easy to identify a major adrenal crash by the various symptoms. There is no mistake when a crash occurs unless it very minor. The majority of pre-crash symptoms are exacerbated and magnified greatly. Recovery, however, is much less obvious and can be confusing. It comes on insidiously, slowly and often time marred with setbacks. This is made more complicated if the body’s constitution is weak. The signs are sometimes hard to detect, and often only become evident with time. Paradoxical symptoms are common, especially for those with weak constitution. Only with long clinical experience, attention to detail, and retrospect does one see a Recovery Phase with clarity.

While most Adrenal Fatigue sufferers are familiar with adrenal crash from personal experiences, most are unfamiliar with the importance of the Recovery Phase of the cycle. A recovery may be real, or maybe a prelude of a forthcoming crash in disguise. In other words, the worse may be over, but it may be yet to come. The ability to recognize whether the body is following an accelerated, normal or delayed recovery curve as well as whether the body’s constitution strong or weak all play important roles to a properly formulated recovery plan.

The management of adrenal crash and adrenal recovery are very different. Administration of nutrients and adjustment of dosages designed to help recovery, if dispensed improperly during the crash phase, may in fact worsen the crash. On the converse, proper application of nutrients during the crash phase can lead to a softer landing and faster recovery. Under expert management, adrenal crash may also present as an opportunity to help the body...
propel directly into the honeymoon period, bypassing the stabilization and preparation period.

Similarly, nutrients required during recovery can be very different from those during the adrenal crash. The focuses are different not only as it relates to crash vs. recovery, but also as it related to each person's unique constitution. During adrenal crash, the focus is to avoid further damage and soften the crash intensity. During the Recovery Phase, the focus is to deploy nutrients to fortify the adrenals to the degree that they can tolerate and clear from the body without triggering another crash due to the often-associated low clearance state. Sometimes the nutrient dosage needs to be reduced during the adrenal crash phase and increased during the Recovery Phase. Other times, it is the reverse. Administering the wrong nutrient and dosage at the wrong time will only worsen the overall Adrenal Fatigue and delay recovery. Understanding the recovery cycle and using properly designed challenges during the right time of the recovery greatly facilitate the overall healing process.

In addition, a careful study of the Recovery Phase of the cycle is critical because the speed and character of the Recovery Phase as shown by the recovery curve is a direct reflection of the amount of adrenal reserve remaining after a crash. Some people recover relatively quickly compared to others. Younger sufferers and those who are constitutionally strong tend to recover faster and can tolerate a stronger support of nutrients, while too strong a nutritional support during Recovery Phase can trigger adrenal crash among others, especially those who are constitutionally weak. The common mistake seen in many self-guided recovery programs is the administration of excessive nutrients under the mistaken belief that more may be better. The many recovery characteristics shown by the body is the only way the body knows how to express the overall adrenal capacity and the degree of decompensation as a result of a crash. A detailed study of the recovery and its various components allows us to understand the many paradoxical reactions that are common during crashes and the ways to avoid them in the future in relation to the specific body. Generally speaking, the stronger the adrenal function remains after the crash, the shorter the Recovery Phase and the closer the post-crash energy level is to the immediate pre-crash baseline. It is the careful attention to the recovery cycle that gives us the markers and thus the ability to design a proper recovery program with accuracy and confidence in order to facilitate maximum healing. The current Recovery Phase curve helps us to formulate preventive measures so that the next crash, should it happen, is shorter, gentler, and the ensuing recovery faster.

Those who do not pay attention to the lessons learned from the Recovery Phase invariably will miss important clinical perils and thus lack a plan to handle future crashes. The result is invariably a body that is subjected to repeated crashes over time.

Conclusion
One of the most difficult and perplexing challenges for clinicians and Adrenal Fatigue sufferers is the management of adrenal crash and recovery cycles. Crashes are triggers that bring sufferers to their physicians in the first place, and they will continue to haunt the sufferer throughout the duration of this condition until their adrenal functions become normalized.

Unfortunately, most inexperienced clinicians and self-navigation efforts fail because of the failure to fully understand the significance of the crash and its subsequent Recovery Phase in detail. The body is communicating to us constantly. With each crash and recovery, signals are sent by the body in the form of signs and symptoms. Clinical excellence requires a detailed investigation and examination into the cause of each crash. Combining this with a careful clinical study of the pre-crash status of adrenal function will give an experienced clinician a better understanding of remaining adrenal reserve and capacity. A clearer picture will generally begin to emerge and one will no longer be dumb-founded at why a crash happens in the first place. The body is logical after all, if only we look deeper.

Understanding the crash and recovery cycle in detail and their characteristics will help the clinician and sufferer better manage the crash as it happens, prepare a soft landing, set a realistic recovery time, and select the proper tools to effect maximum adrenal healing in the shortest time with minimum risk of triggering a subsequent crash. It also helps the sufferer to understand the natural progression of Adrenal Fatigue and to have realistic expectations of the road ahead.
Adrenal Insufficiency and Addison’s Disease

What is adrenal insufficiency?
Adrenal insufficiency is a condition—also known as adrenal failure or Addison’s disease—when the adrenal glands cannot produce enough of the hormone cortisol. The adrenal insufficiency can be primary or secondary.

Primary adrenal insufficiency, also known as Addison’s disease, occurs when the adrenal glands are damaged and cannot produce enough of the hormone cortisol and often the hormone aldosterone. Addison’s disease affects one to four of every 100,000 people, in all age groups and both sexes.

Secondary adrenal insufficiency occurs when the pituitary gland—a small organ in the brain—fails to produce a hormone called adrenocorticotropic hormone (ACTH), a hormone that stimulates the adrenal glands to produce cortisol. If ACTH output is too low, cortisol production drops. Eventually, the adrenal glands can shrink due to lack of ACTH stimulation. Secondary adrenal insufficiency is much more common than Addison’s disease.

What do adrenal hormones do?
Cortisol
Cortisol belongs to a class of hormones called glucocorticoids, which affect almost every organ and tissue in the body. Cortisol’s most important job is to help the body respond to stress. Among its many vital tasks, cortisol helps:

- Maintain blood pressure and cardiovascular function
- Slow the immune system’s inflammatory response
- Maintain levels of glucose—a form of sugar used for energy—in the blood
- Regulate the metabolism of proteins, carbohydrates, and fats

The amount of cortisol produced by the adrenals is precisely balanced. Like many other hormones, cortisol is regulated by the brain’s hypothalamus and the pituitary gland. First, the hypothalamus releases a “trigger” hormone called corticotropin-releasing hormone (CRH) that signals the pituitary gland. The pituitary responds by sending out ACTH, which in turn stimulates the adrenal glands. The adrenal glands respond by producing cortisol. Completing the cycle, cortisol then signals back to both the pituitary and hypothalamus to decrease these trigger hormones.

The hypothalamus sends CRH to the pituitary, which responds by sending out ACTH. ACTH then causes the adrenals to release cortisol into the bloodstream.
Eductor

The word 'Doctor' comes from the Latin word 'Eductor' which means 'to teach'.

Thomas Edison said that the doctor of the future will teach the patient how to live and how to eat, exercise and meditate.

The Eductor is a Biofeedback Teacher

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