

Air National Guard

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Fatigue in the Active Adult



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Chad Asplund, MD

- **Has no relationships to disclose.**



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Case

- **52-year-old dedicated endurance athlete reports declining performance, poor recovery, and persistent fatigue despite “training hard.” Labs were normal last year.**
- **“Tired all the time”**
- **“Harder to perform at same level”**

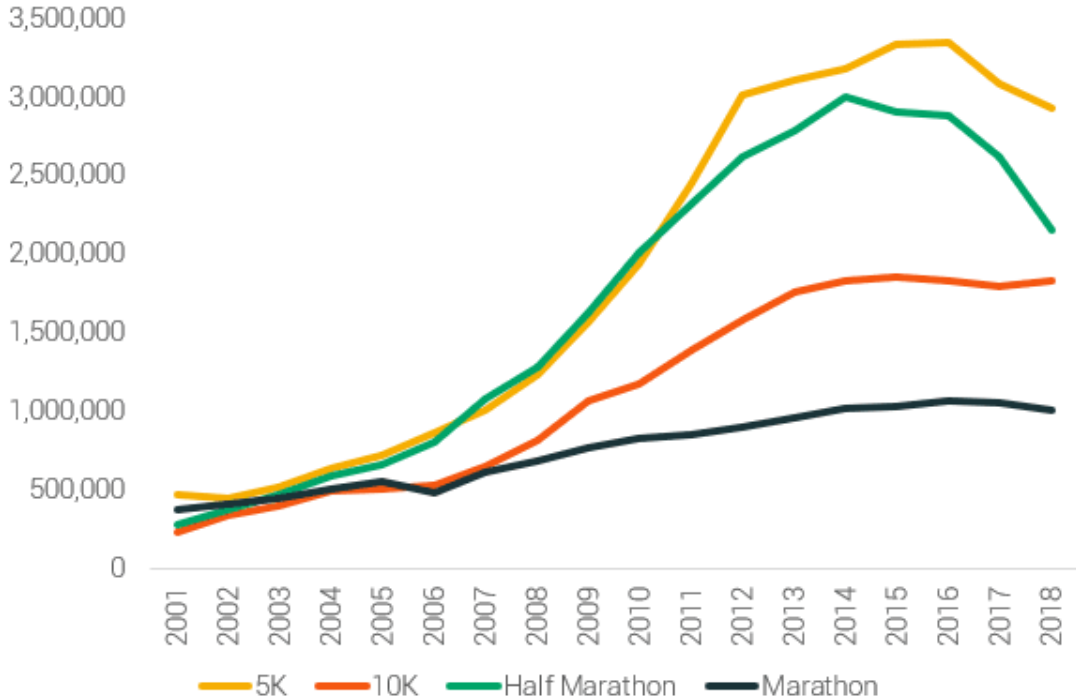




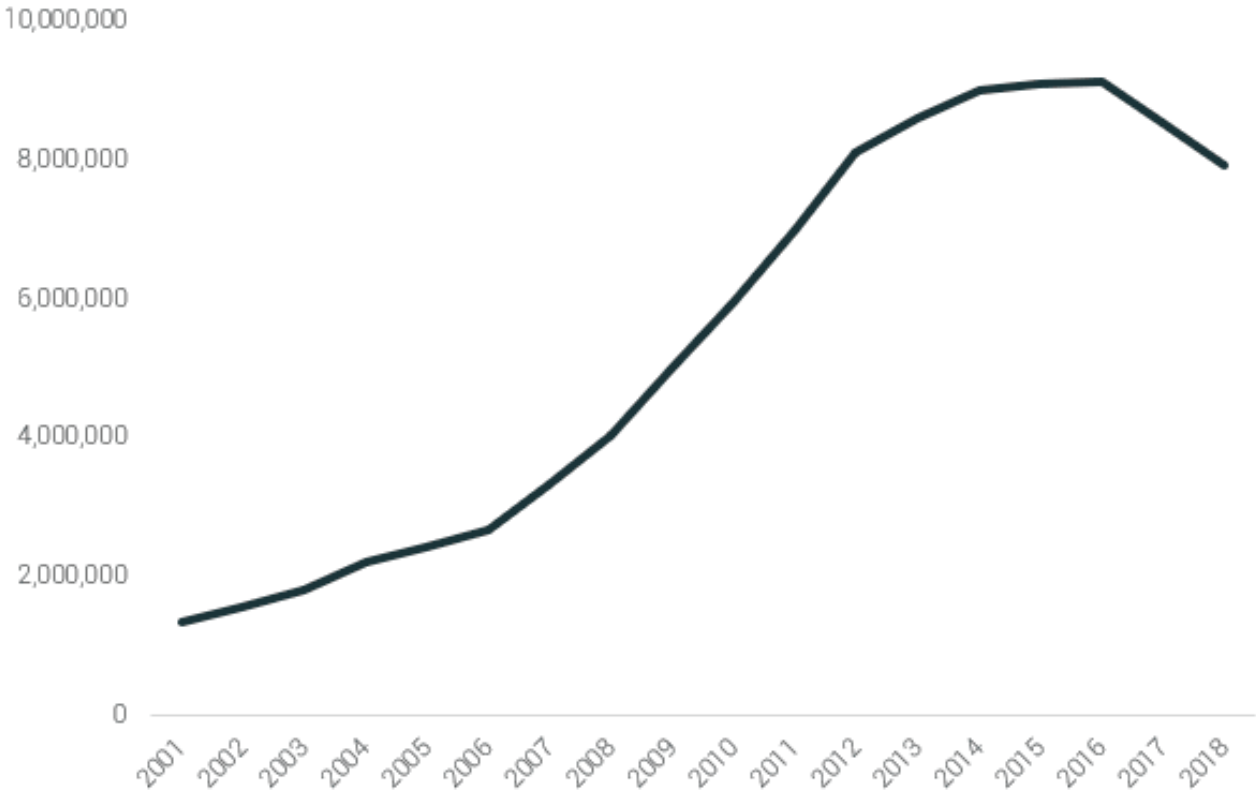
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Participation

Participation trends by distance



Total number of participants



<https://runrepeat.com/the-state-of-us-marathons-2025>



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Underperforming Athlete Clinic

- Mayo Clinic
- 2019-2023
- 100's of athletes
 - Easy lab fixes
 - Overtraining/RED-S
 - Medical
 - Asthma/EIB, allergy, autoimmune, celiac, lyme, cardiac, MS, mitochondrial myopathy





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Objectives



- **Build a differential for fatigue in athletic patients.**
- **Recognize common causes for athlete fatigue**
- **overtraining syndrome (OTS) and RED-S.**
- **Apply a practical evaluation framework.**
- **Speak the language**



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Endurance Athlete Challenges

- **Why are endurance athletes challenging to decipher?**
- **They often have high pain tolerance, normalize abnormal symptoms, and have their identity tied to training. They can appear “healthy” on standard labs despite underlying issues.**





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Speaking the Language

- **The most critical step. Validate their symptoms. Avoid blame. Frame fatigue as a physiological mismatch, not a weakness.**
- **Don't immediately jump to overtraining syndrome**
- **The cornerstone is reducing training load. Reduce intensity before volume. Avoid complete cessation of activity unless medically necessary.**



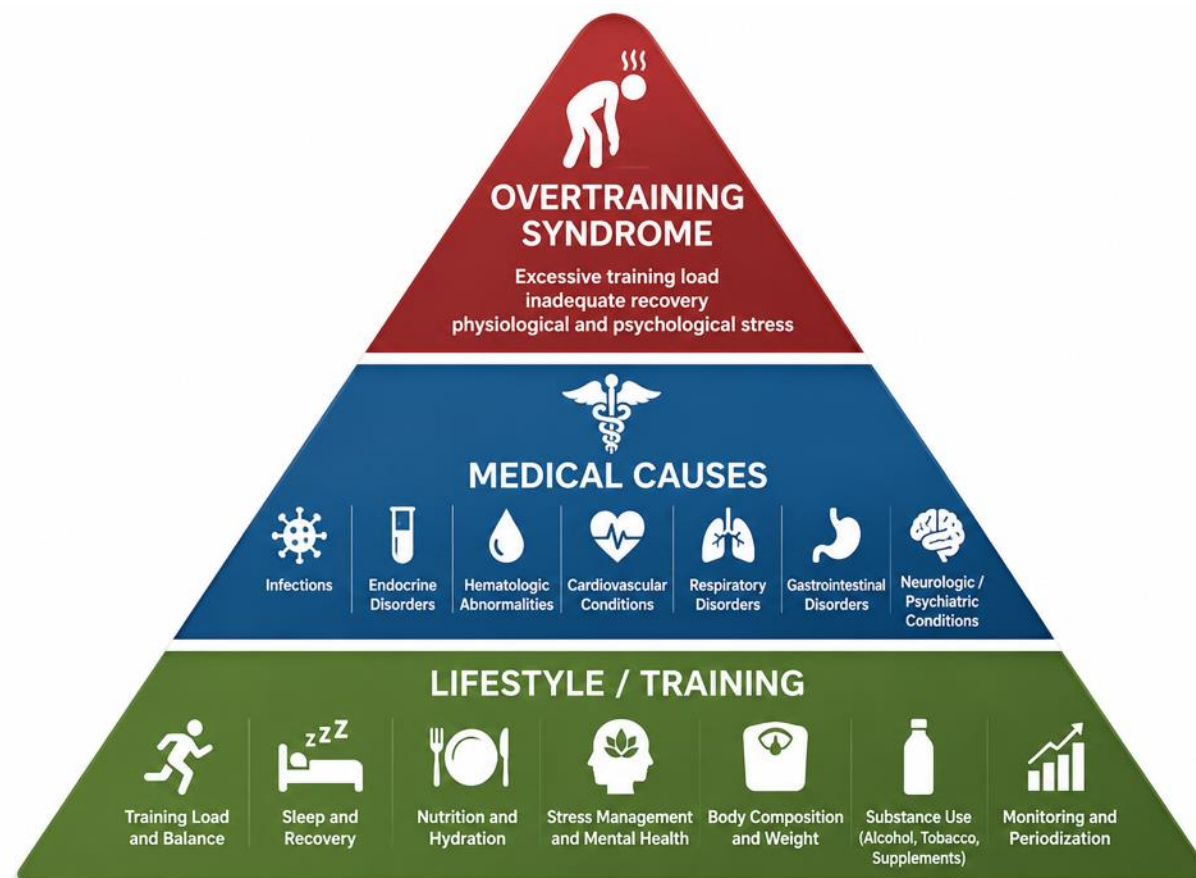
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“Fatigue Pyramid”

- **Top: Overtraining syndrome**
 - Diagnosis of exclusion
- **Middle: Medical Causes**
 - Lab work
 - Medical evaluations
- **Base: Lifestyle/Training**
 - Most common
 - Overlooked by many athletes





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Medical Visit





History

- **Training load and recent changes**
- **Recovery practices**
- **Nutrition and hydration**
- **Sleep patterns**
- **Psychosocial stressors**

Physical

- **Usually nonspecific**
- **Assess weight trends and vitals**
- **Look for signs of endocrine or systemic disease**



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Primary Care Labs/Studies

Tier 1 – First Visit

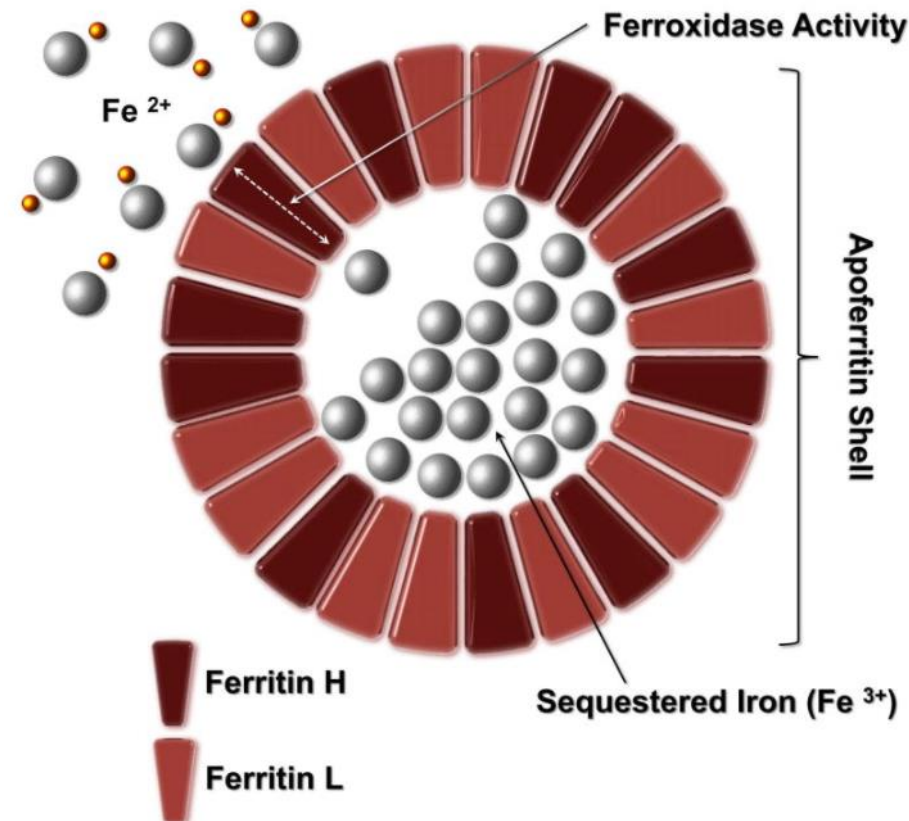
- **Fatigue labs:**
 - **CBC with diff**
 - **CMP**
 - **Ferritin**
 - **Vitamin D**
 - **TFTs**
 - **B12**

Tier 2 – Subsequent Visits

- **EBV IgG/IgM, IgE**
- **ANA, RF**
- **Lyme Titer**
- **Celiac screen**
- **Spirometry**
- **Allergy testing**
- **Cardiac Testing**



- Normal lab values: >15-20
- Endurance athletes: 30-50 or 60+ high level
- Ferrous Glycinate 25mg 30 min before or after a meal with vitamin C
- 2x/day x 2 weeks then 1x/day x 4 weeks - recheck

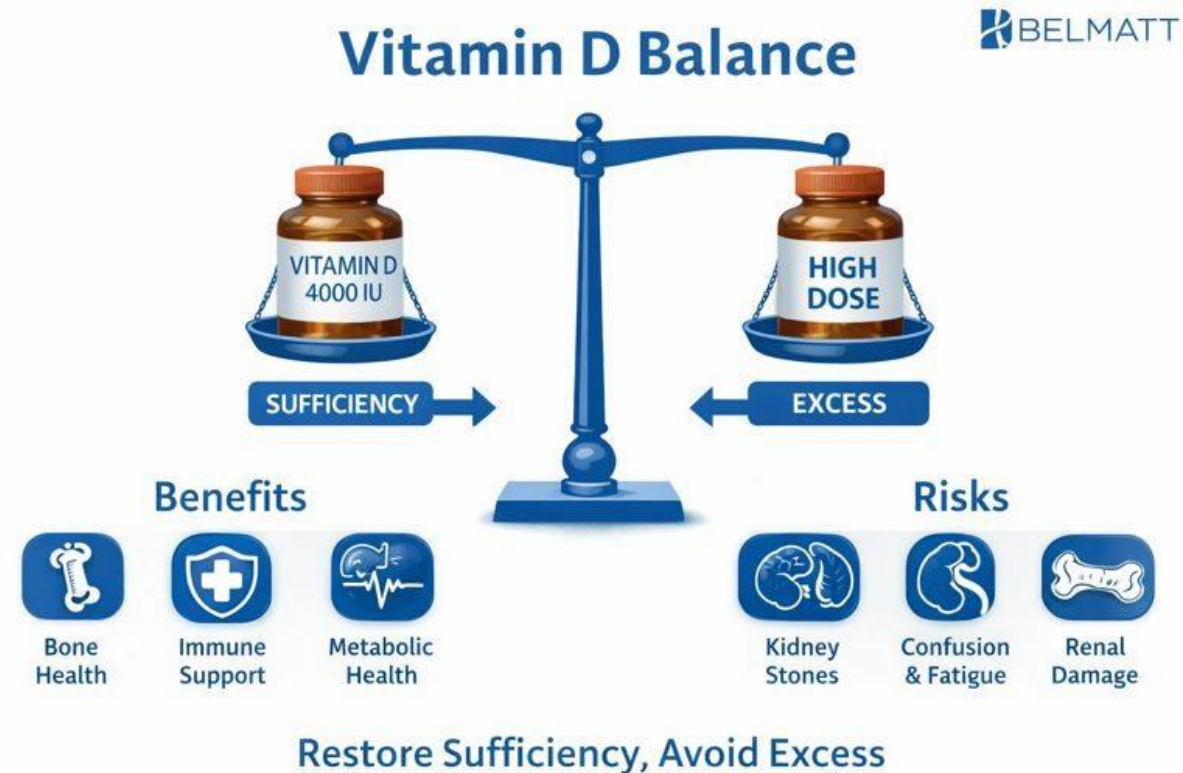




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Vitamin D

- Important for prevention of stress fractures
- Very low Vit D can impact muscle strength and fatigue
- Serum 25(OH)D
- Should aim for at least 30-40 ng/mL





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B12/Folate

- **Less common than ferritin or vitamin D, but can have big impact on performance**
- **Vegetarians/vegans**
- **Low normal range (LabCorp) 200 pg/mL**
- **If B12 < 340 pg/mL – check homocysteine or MMA**
- **If elevated – B12 supplementation recommended**
- **Supplement 1,000 to 2,000 micrograms of methyl cobalamin**
- **Don't take with Vitamin C**



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Post-viral fatigue

- Athletes should subscribe to the “neck check”
 - Symptoms above the neck – low intensity exercise permitted
 - Below neck – REST
 - Fever – ABSOLUTE REST
- But...

POSTVIRAL FATIGUE SYNDROME

The core clinical symptoms are always the same: severe fatigue made worse by exercise, myalgia, night sweats, atypical depression and excessive sleep. The other common symptoms include dysequilibrium disorders and irritable bowel syndrome.

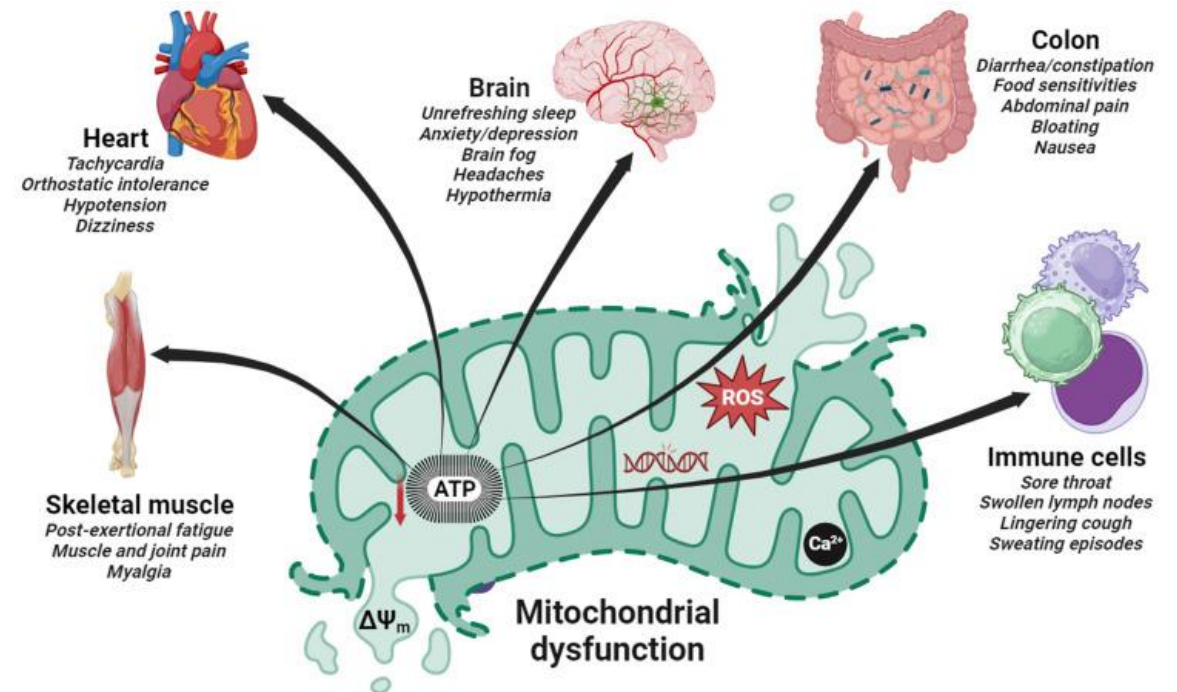
—Behan et al (2007)



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Post-viral Fatigue – CoQ10

- No FDA approved treatment
- Link between mitochondrial dysfunction and low-grade systemic inflammation similar to that found in PVF
- CoQ10 supplementation may play a role
 - Ubiquinol > ubiquinon
 - 100-200mg per day



Int J Mol Sci 2024; Comp Ther in Med, 2022; Front Pharm, 2022



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Follow-up visits

- **Review labs – supplement where needed**
- **Recheck in 6-8 weeks**
- **Review symptoms**
- **If no improvement – consider Tier 2 labs:**
 - **EBV, IgE, Lyme, Celiac**
 - **CMV**
 - **ANA, RF**
 - **Spirometry**
 - **Allergy Testing**
 - **Cardiac testing**

This is where assessing for the “Base of the Pyramid” comes in



Base – Lifestyle/Training



Most common factors in decreased athlete performance



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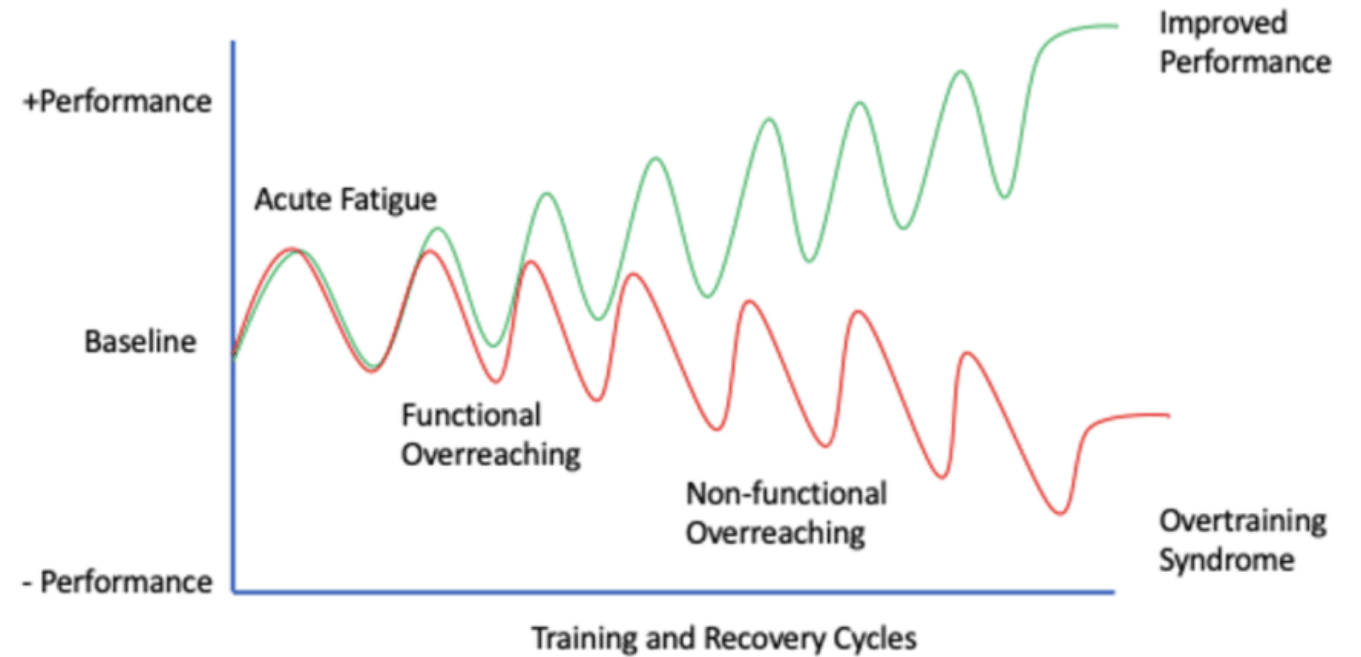
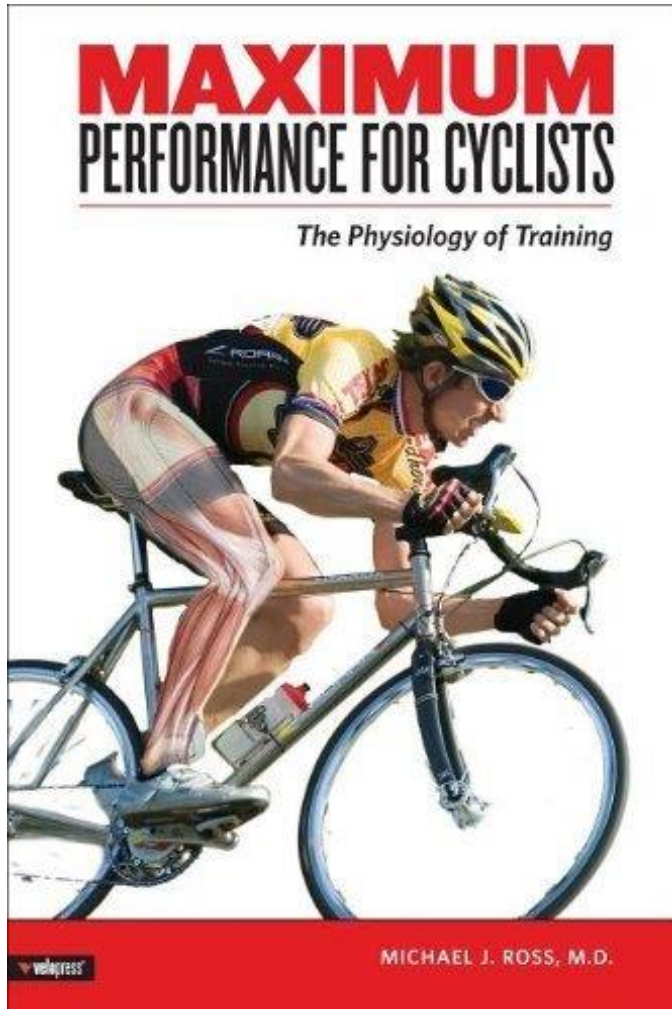
Initial Recommendations

- **Check training (w/coach) – deload week – cut volume by 30-50%**
- **Deep dive on nutrition – food diary counting calories and macronutrients**
- **Aim for 7-9 hours of consistent sleep**
- **Reevaluate in 2-4 weeks**
- **If no improvement – go to Tier 2 labs**



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Overreaching/Overtraining



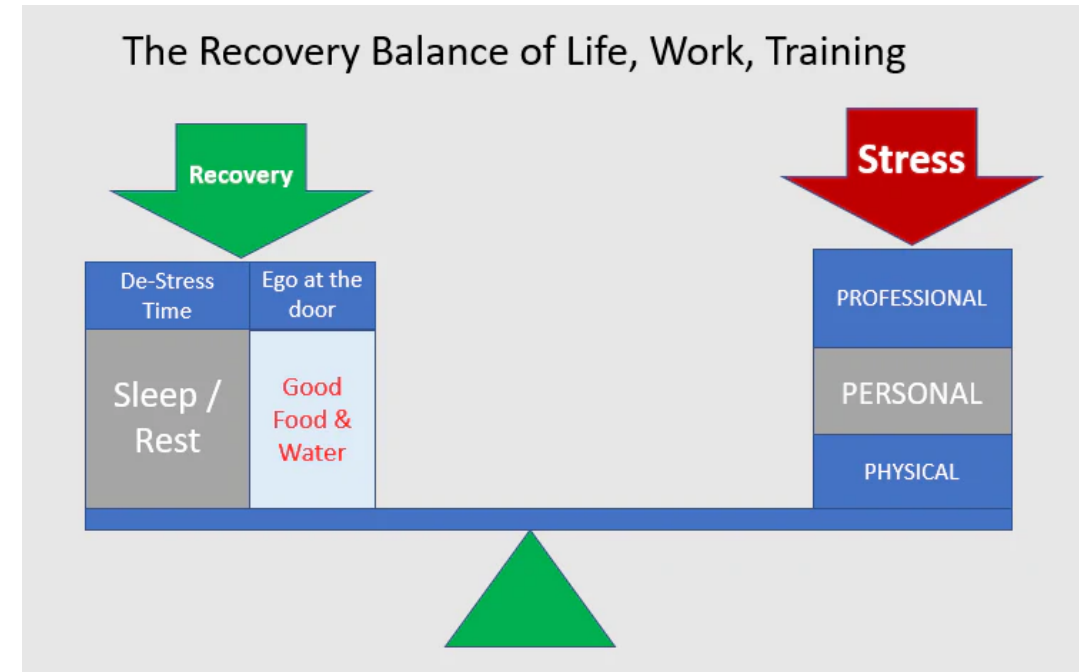
Overtraining Progression as described by Irene Margaritis, 2019.⁷



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Diagnostic Framework

- Must get a sense of training hours, intensity, sleep, nutrition
- Also, must assess hours of work
- Other life stresses
- Measurables





Focused History

Category	Key Questions/Focus Areas
Training load	Recent changes in volume, intensity or frequency? Any monotony in training?
Nutritional Status	Intentional/unintentional weight loss? Calorie intake vs. expenditure
Psychosocial	New stressors at home or work? Mood/affect changes?
Review of Systems	Dyspnea, palpitations, orthostasis, post exertional malaise
Medication/Supplements	All OTC supplements, pre-workouts, stimulants, Rx meds

Red flags – Weight loss > 10%, nocturnal fevers, night sweats, lymphadenopathy, chest pain, near syncope during exertion



■ **Relative Energy Deficiency Syndrome**

- **Low energy availability impairs health and performance**
- **Intentional or unintentional**
- **Male or Female**

■ **Simple screening Q's for PC:**

1. **Energy – are you an athlete that frequently feels fatigued, sluggish or struggle to focus throughout the day?**
2. **Nutrition – do you restrict the amount of food you eat, skip meals, or avoid entire food groups?**
3. **Health/performance - have you experienced a plateau or decrease in sports performance, repeated injuries or irreg periods**

[Br J Gen Pract, 2022]



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Nutriton Calculators – Mifflin-St. Jeor

■ Mifflin-St. Jeor most accurate in active adults

Add in TDEE

Ballpark to assess for meeting nutritional needs

Instructions for Calculator

1. Click the menu button and select (US) Standard Units or Metric Units.
2. Select your biological sex and enter your stats (height, weight, age).
3. Now you have your BMR and estimates of your daily burn depending on your activity level.
4. Finally enter your activity level to get your estimated daily burn. Use the Standard guide below find your activity level multiplier OR take our [free quiz to get an estimate!](#)

STANDARD ACTIVITY LEVEL MULTIPLIERS

BMR X 1.2: If you are sedentary = little to no exercise in a day

BMR X 1.375: If you are slightly active = light exercise/sports 1-3 days/week

BMR X 1.55: If you are moderately active = moderate exercise/sports 3-5 days/week

BMR X 1.725: If you are very active = hard exercise/sports 6-7 days a week

BMR X 1.9: If you are extra active = very hard exercise/sports and physical job OR 2x training

(US) Standard Units

Enter Your Stats Below

Sex: Female

Weight (lbs):

Height (inches):

Age (years):

BMR: -161

Activity Level	Multiplier	Burn
BMR aka Bedridden	BMR x 1	-161
Sedentary	BMR x 1.2	-193
Lightly Active	BMR x 1.375	-221
Moderately Active	BMR x 1.55	-250
Very Active	BMR x 1.725	-278
Extremely Active	BMR x 1.9	-306

Total Daily Energy Expenditure

Activity Level (between 1.1-2.0):

Estimated TDEE Range: 16 -16

Your Average TDEE: 0

<https://www.leighpeele.com/mifflin-st-jeor-calculator>



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Nutrition Resources



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MACRONUTRIENTS & SUPPLEMENTS



DISORDERED EATING



PERFORMANCE CONSIDERATIONS



<https://sportsrd.org/downloadable-resources>



- Aim for 7-9 hours per night
- Stress sleep hygiene
- Magnesium glycinate supplementation can be helpful
- 100-200mg 30-60min before bed
- Mindfulness

CHECKLIST FOR ATHLETES TO CONSIDER TO ENHANCE SLEEP

- 1 Quiet environment
- 2 Maintain room temperature (~18°C)
- 3 Ensure that bedding/clothing does not cause an environment that is too hot
- 4 Sleep routine: consistent time each night for falling asleep to begin and waking up
- 5 Avoid caffeine and food/fluid ingestion leading up to sleep (no nap, however)
- 6 Avoid the use of computer, tablet, TV before sleeping
- 7 Napping not later than midafternoon
- 8 At least 7 h sleep a night
- 9 Ensure dark room with no light source present

Reference: by Marshall & Turner, Strength Cond J, 2016

Designed by @YLMsportScience



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Sleep - CBTi




■ Gold standard for insomnia and sleep disturbances

- Dedication
- Self-motivation

■ Attacks root cause of insomnia

CBT-I What Cognitive Behavioral Therapy for Insomnia Actually Includes

CBT-I is a structured, evidence-based program that helps you change the thoughts and habits that keep insomnia going so sleep can improve naturally.

WHAT CBT-I IS CBT-I (Cognitive Behavioral Therapy for Insomnia) is a short-term therapy that treats the cause of insomnia by changing unhelpful thoughts and habits around sleep. 	CBT-I IS NOT JUST "SLEEP HYGIENE" Sleep hygiene is only a small piece. CBT-I also includes: <ul style="list-style-type: none"> ✓ Structured behavior changes ✓ Addressing worry and fear about sleep ✓ Personalized strategies that are tested and adjusted over time 	WHO CBT-I IS FOR CBT-I is designed for adults who: <ul style="list-style-type: none"> Have trouble falling asleep Wake in the night or too early and can't return to sleep Feel tired but "wired" with a busy or worrying mind No diagnosis is needed to start.
WHAT CBT-I TYPICALLY INCLUDES		
1 SLEEP SCHEDULING STRATEGIES <ul style="list-style-type: none"> Set consistent wake time Adjust bedtime to build healthy sleep drive Make sleep more efficient and predictable 	2 CHANGING HABITS THAT KEEP INSOMNIA GOING <ul style="list-style-type: none"> Limit time in bed awake Reduce naps and evening stimulants that backfire Create routines that support, not fight, natural sleep 	3 WORKING WITH WORRY & SLEEP-RELATED FEAR <ul style="list-style-type: none"> Notice and challenge unhelpful thoughts Let go of pressure to sleep perfectly Replace fear with confidence and self-trust
WHAT CBT-I DOES NOT INVOLVE		HOW CBT-I HELPS OVER TIME
<ul style="list-style-type: none"> NOT JUST RELAXATION TIPS Relaxation can help, but CBT-I goes far beyond deep breathing and calm-down lists. NOT FORCING SLEEP CBT-I does not make you stay awake. It builds the right conditions for sleep to come more easily. NOT ONE-SIZE-FITS-ALL CBT-I is tailored to your sleep pattern, stress level, health, and goals. 		 <ul style="list-style-type: none"> BUILD CONSISTENCY Stronger sleep drive through steady habits REDUCE PRESSURE Less clock-watching, less stress about sleep REGAIN CONFIDENCE More trust in your ability to sleep well again
WHEN TO SEEK PROFESSIONAL HELP <ul style="list-style-type: none"> ✓ Sleep problems last more than a few weeks or months ✓ Insomnia is affecting mood, focus, work, or health ✓ You've tried sleeping better on your own but nothing has made a lasting difference 		CBT-I is available in Tennessee through ScienceWorks Behavioral Healthcare via secure telehealth.  Learn more: scienceworkshealth.com



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Mental Stress - Mindfulness

- **Mediates stress**
- **Enhances mental and physical recovery [Sport J, 2015]**
- **Aids in psychological resilience as well as recovery [Front Psych, 2025]**
- **Lowers cortisol**
- **Improves sleep quality**
- **Decreases injury risk [J Sports Sci Med, 2021]**
- **Enhances endurance performance [Neural Plast, 2020]**



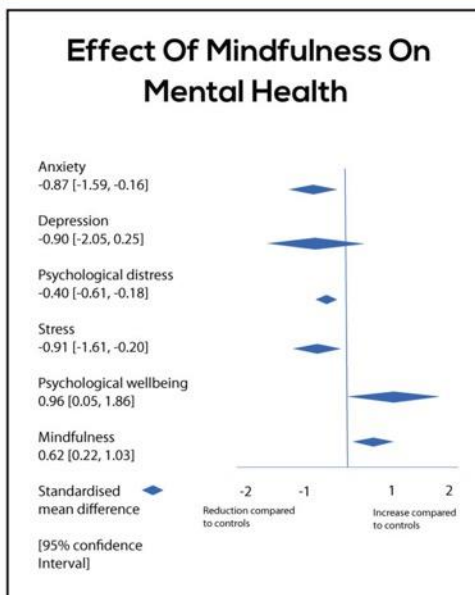
The effect of mindfulness-based interventions on elite athlete mental health

A Systematic Review And Meta-analysis

- ◆ Meta-analysis including 12 randomised controlled trials (RCTs)
- ◆ Investigated the effect of mindfulness-based programmes (MBPs) on mental health
- ◆ The first systematic review and meta-analysis to focus on mental health outcomes exclusively in elite athletes, evaluating randomised controlled trials only

Main findings

- 1 Mindfulness training significantly reduced symptoms of anxiety, stress, psychological distress, and increased psychological wellbeing.
- 2 There was a large but non-significant effect size associated with mindfulness training reducing symptoms of depression.



Key messages



A range of mindfulness practices improved mental health, from pre-recorded exercises completed alone at home, to intensive in-person group sessions delivered by experienced mindfulness teachers.



The most effective method appeared to be high-fidelity programmes that were adapted specifically for sport. Mindfulness-based programmes may also be particularly effective for older athletes, especially retired elite athletes.



Mindfulness has been used widely in sport to improve athletic performance. We found that both competition anxiety and general symptoms of anxiety were alleviated by mindfulness practice, suggesting mindfulness can improve mental health and performance together.



Social @kearnanmyall
Media @kearnanmyall

Graphic References

Myall K, Montero-Marin J, Gorczyński P, et al Effect of mindfulness-based programmes on elite athlete mental health: a systematic review and meta-analysis British Journal of Sports Medicine Published Online First: 12 October 2022. doi: 10.1136/bjsports-2022-105596



BJSM, The Effect of Mindfulness Interventions on Elite Athlete Mental Health, 2022



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OTS – Diagnosis of Exclusion





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Overtraining Syndrome

- **Overtraining syndrome is a complex medical condition that occurs when repetitive, intensive training overwhelms the body's ability to repair and recover.**
- **It is a state of chronic physical and psychological exhaustion where performance declines despite continued training, often taking weeks to months to heal**





Symptoms of Overtraining

MOOD SWINGS		ELEVATED MORNING RHR		STRUGGLING WITH TRAINING AND PERFORMANCE	
LOSS OF APPETITE		MUSCLE SORENESS		LACK OF FOCUS	
FREQUENT COLDS AND INFECTIONS		PERSISTENT FATIGUE		SLEEP ISSUES	

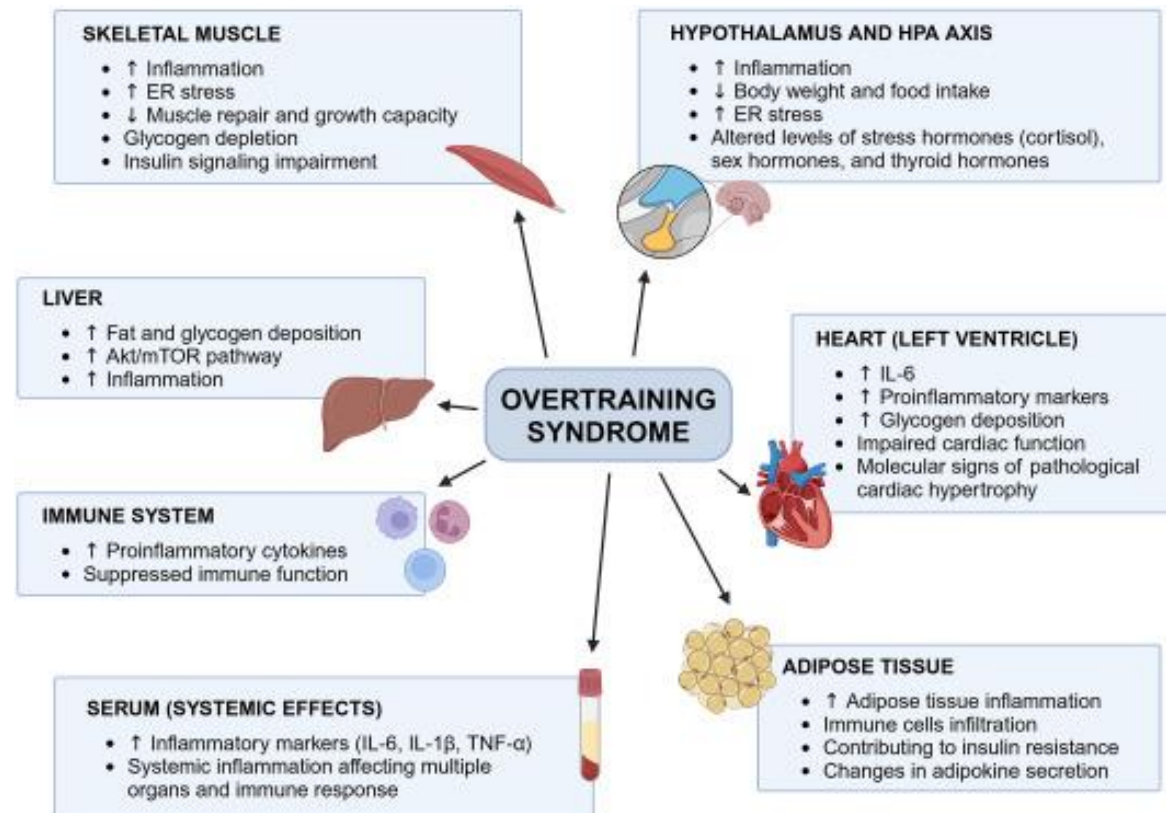
metrifit®



■ Multisystem breakdown

- Nervous system – balance of autonomic nervous system thrown off
- Endocrine system – hormones out of balance, elevated cortisol, decreased testosterone or GH
- Immune system – proinflammatory state that suppresses immune function

[Sp Med Health Sci, 2025]





Stages of Overtraining

A three-stage model of the overtraining syndrome

It can start with the transition from healthy to unhealthy training, functional to nonfunctional overreaching, and positive exercise benefits to the onset of impairment. It is highlighted by abnormal physical, biochemical and mental-emotional injuries.

	Stage 1 Overtraining	Stage 2 Overtraining	Stage 3 Overtraining
Alternative Terms:	Acute uncompensated stress. Nonfunctional overreaching.	Excess stress. Sympathetic overtraining.	Chronic excess stress. Chronic overtraining.
Performance Response:	Increased training stress and/or lack of recovery. increased risk of health and fitness impairments. Onset of abnormal signs/symptoms.	Training and competitive performance decrements without prolonged recovery. Further health and fitness impairment, including immune and GI dysfunction.	Reduced HPA axis response to stress. Training and competitive performance greatly diminished with worsening health.
Symptoms:	Increased sense/awareness of stress and need for recovery/sleep. Increased fatigue, hunger and muscle soreness.	Fatigue, pain, depression, anxiety. Daytime sleepiness. Cravings for sweets.	More serious progression of symptoms from Stage 2. Reduced training and competitive motivation.
Signs:	Reduced submaximal performance (aerobic threshold). Increased resting HR, sleep disturbance.	Increased cortisol/sympathetic tone. Other hormone imbalance. Menstrual problems. Increased resting and exercise HR. Increased illness/physical injury. Sleep disturbance.	Serious progression of illness, injury, poor health. Reduced sympathetic & parasympathetic function, cortisol and other hormones. Reduced resting HR.
Actions:	Reduce training intensity and/or volume. Increase recovery and sleep. Address lifestyle stress including diet. Complete clinical evaluation if no response after one week.	Stop high-intensity training/competition, reduce training volume. Increase recovery/sleep. Address diet/other lifestyle stress. Complete clinical evaluation.	Eliminate hard training, competition. Reduce training volume significantly. Increase sleep. Ongoing clinical care including diet and other lifestyle stress.
Recovery:	Short: ~1-3 weeks	Moderate: ~1-3 or more months.	Long: months to years.

<https://philmaffetone.com/the-overtraining-syndrome/>



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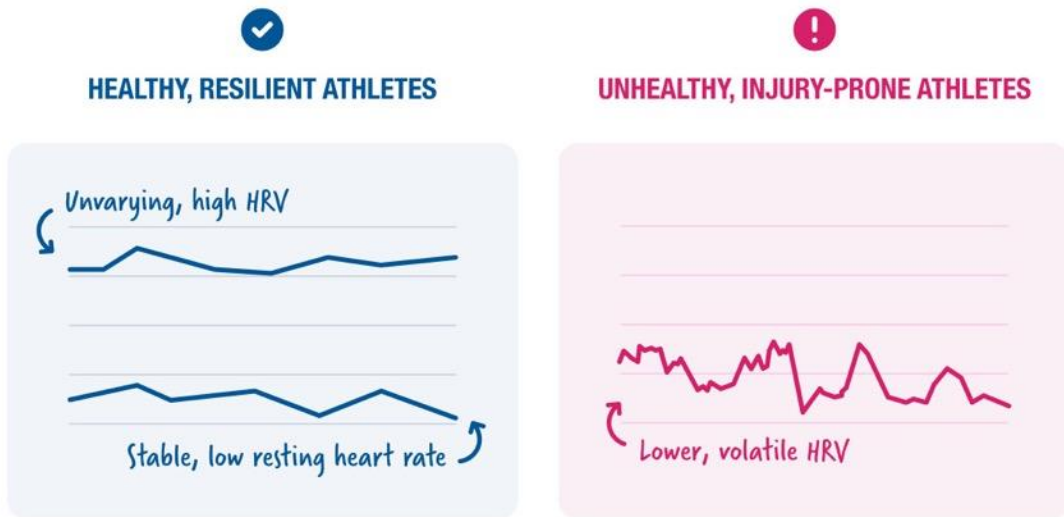
Prevention of Overtraining

- **Prioritize structured recovery**
 - 1 or 2 rest days per week
 - Sleep 7-9 hours
 - Nutrition/hydration
 - Monitor HRV/Fatigue Score
- **HRV elevated = good, reduced = bad**
 - Measure of autonomic variability
 - Indicates when body is recovered
 - Best if baseline established
- **Monitor HRV**
 - Oura ring*
 - Whoop band
 - Apple watch
- *** Best at measuring RHR/HRV [Physiol Rep, 2025]**



Heart Rate Variability

- Natural, millisecond-level fluctuation in time intervals between consecutive heart beats
- HRV is driven by autonomic nervous system
 - Parasympathetic – promotes relaxation – increase time b/t
 - Sympathetic – stress – decreases time b/t
 - High HRV – relaxed, well recovered
 - Low HRV – symp syst overdrive





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Recovery Coach

- **Matt Dixon, a.k.a. “the Recovery Coach”**

 - **“Lifestyle recovery is just as important as training recovery”**

 - **Sleep, nutrition, fueling, naps, meditation**
- **Most common recovery related mistakes**
 - **Failing to refuel after workouts**
 - **Going too hard on easy days**
 - **Believing life is a spreadsheet**



“Recovery” Training

- Busy orthopedic surgeon, small children, training and competing in Ironmans.
- Exhausted, performance dropped off severely.
- Low + ANA, RF
- SLE – DMARD
- Purple patch fitness training



Purple Patch Philosophy

“I hit all-time bests in both running and cycling in October leading up to the World Championships. The Purple Patch philosophy was an immensely helpful framework for me! I started feeling like myself again training, and re-found joy. The evidence that the plan is working is right in front of me: I’m healthy. I’m having fun. I’m hitting personal bests.”



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Questions?



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