



High Intensity Interval Training (HIIT)

NAFTA TRAINING

Understanding the Basics

CHAPTER 1: What is HIIT

- Background
- Who can perform HIIT
- Benefits of HIIT
- HIIT Workout Programs
- How HIIT Compares to Other
- Concerns with HIIT Programs

Background

- o 1937
- o 1940-1950
- o 1970

What is HIIT?

- o **High-intensity interval training (HIIT)**, also called **high-intensity intermittent exercise (HIE)** or **sprint interval training (SIT)**, is a form of **interval training**, a cardiovascular exercise strategy alternating short periods of intense **anaerobic exercise** with less intense recovery periods, until too exhausted to continue. Though there is no universal HIIT session duration, these intense workouts typically last under 30 minutes, with times varying based on a participant's current fitness level.
- o **HIIT workouts provide improved athletic capacity and condition** as well as improved **glucose metabolism**. Compared with other regimens, HIIT may not be as effective for treating **hyperlipidemia** and **obesity**, or improving muscle and bone mass.⁴¹ However, research has shown that HIIT regimens produced significant reductions in the fat mass of the whole-body.⁴² Some researchers also note that HIIT requires "an extremely high level of subject motivation" and question whether the general population could safely or practically tolerate the extreme nature of the exercise regimen.

What is HIIT?

- o HIIT is training done at:
 - o High intensity (PRE > 8/10) or 90%+ VO2 peak activity over short intervals (30s or less but some say out to 5 mins...) followed by periods of varying (depending on the fitness level of the athlete) periods of recovery performed at low intensity
 - o Recovery is not full but too short can lower the intensity and therefore outcome or goal of the session
 - o Is it aerobic?
 - o Is it anaerobic/lactic?

High-Intensity Interval Training

- Specialized form of IT
 - Short intervals of max intensity exercise-low to moderate intensity exercise
- Similarities to traditional interval training
 - Differences include:
 - Increased EPOC
 - Burn more fat
 - Limits muscle loss
- To get the benefits from HIIT
 - push yourself past the upper end of your aerobic zone & allow your body to replenish your anaerobic energy system during the recovery intervals
- HIIT involve *maximum* effort, not simply a higher heart rate
 - there are many different approaches to HIIT
 - different numbers of high and low intensity intervals
 - different levels of intensity during the low intensity intervals
 - different lengths of time for each interval
 - different numbers of training sessions per week

Guidelines for HIIT

- designed for people who want to boost overall cardiovascular fitness, endurance and fat loss without losing muscle mass
- Before starting the program, you should be able to exercise for at least 20-30 minutes at 70-85% of maxHR
- gradually build up your training program so that you don't overdo it
- warm up and cool down
- Work as hard as you can during the high intensity intervals, until you feel the burning sensation in your muscles indicating that you have entered your anaerobic zone
- If you experience any chest pain or breathing difficulties during your HIIT workout, **cool down** immediately
- HR should be at 70% of maxHR during recovery
 - If it is not: shorten work intervals and/or lengthen recovery intervals

How HIIT Works

- High Intensity
- After Burn
- Constant Change
- Effective Exercise Combinations

Benefits of HIIT

- Increase Metabolism
- Increase Afterburn Effect
- Improves Aerobic Capacity
- Improves Heart Health
- Reduces Blood-sugar levels
- Eliminates Exercise Boredom
- Challenging
- Quick

HIIT Benefits

- Effective Weight Loss
- Fast, Flexible and Fun
- Lose Fat, NOT MUSCLE
- Improved Heart Health

What You Need

- Footwear
- Towel
- Foam Roller
- Yoga Mat
- Watch or Timer

Who Can Perform HIIT

- ACSM GUIDELINES
- Virtually anyone can participate

HIIT Workout Programs

- The Fartlek Method
- The Tabata HIIT Workout
- The Gibala Regimen
- The 10-20-30 Program

HIIT vs Other

- Crossfit
- METcon3
- Turbo Fire
- Insanity Workout
- Zumba

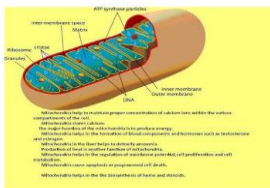
Concerns with HIIT

- Medical Clearance

CHAPTER 2: The Science Behind HIIT

- Energy and the Body's Use of Oxygen
- Sleep-Surprising Connection
- Aerobic Aspects of HIIT
- Anaerobic Aspects of HIIT
- Overtraining Syndrome
- It Comes Down to the Fuel

Energy and the Body's Use of Oxygen



Sleep-Surprising Connection

- HIIT is an effective strategy to minimize sleep deprivation

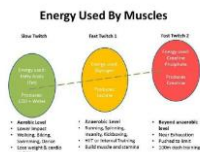
Aerobic Aspects to HIIT

1. Increased cardiac muscle mass
2. Increased stroke volume
3. Increased disposal of metabolic wastes
4. Increased oxidative enzymes and efficiency
5. Faster diffusion rates of oxygen and fuel into muscle
6. Increased left ventricle dilation and chamber volume
7. Increased carbohydrate sparing (thus greater use for fat as fuel)
8. Increase in mitochondria (energy factory of cell)
9. Increase in cell regulatory mechanisms of metabolism
10. Increased fat oxidation
11. Increased expression of fatigue-resistance slow twitch muscle fibers

Anaerobic Aspects to HIIT

- Fat Burning Longer
- Its Efficient
- Increase your Metabolism

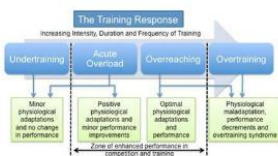
Anaerobic



Overtraining

- "Get your daily fitness HIIT with our signature class! An intense half hour comprised of mainly bodyweight exercises and cardio. This class is a total body workout. Encouraged to push each move to **your maximum effort, you should feel completely wiped at the end of this class**"
- This is **not** how to achieve the maximum effects of a HIIT workout, and can result in overtraining.
- **Overtraining** is the result of giving your body more work or stress than it can handle. Overtraining occurs when a person experiences stress and physical trauma from exercise faster than their body can repair the damage.
- Overtraining results from a variety of physiological sources including a buildup of metabolic waste, strain on the nervous and immune systems, and micro tears in the muscles. It affects a body both physically and emotionally, with symptoms ranging from elevated morning blood pressure, changes in one's mood (anxiety, depression, irritability), susceptibility to illness, chronic fatigue and muscle and joint aches.
- Ways to prevent, or counter the effects of overtraining include proper training regimen, rest, reduce volume and intensity, sleep and manual therapy such as deep-tissue massage.

Overtraining-cont



CHAPTER 3: HIIT and Nutrition

- Understanding the Fueling Process
- It is all about Carbohydrates
- But Not Just Carbohydrates
- Your Diet and HIIT
- Don't neglect proper hydrations
- A word about Toxins

Understanding the Fueling Process

- Carbohydrates
- Fats
- Proteins
- Water
- Vitamins
- Minerals

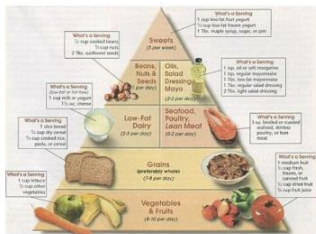
It is all about Carbohydrates

- Are the source of the energy that fuels muscle function

But Not Just Carbohydrates

- Proteins
- Vitamins
- Minerals
- Processed Foods

Your Diet and Hiit



Hydration

- 2-3 gallons of water per day
 - It provides the fluidity to blood to transport oxygen and nutrients
 - Water helps regulate body temperature
 - Hydration facilitates digestion and other body functions
 - Water helps flush out and remove cellular wastes and toxins

Toxins



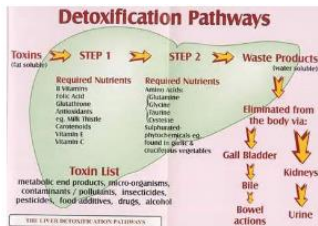
The body detoxifies in several ways:

- Digestive tract
- Liver
- Kidneys
- Respiratory system and lungs
- Lymphatic System
- Skin

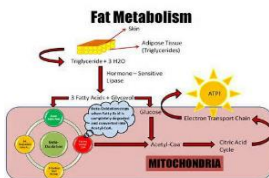
CHAPTER 4: HIIT and Weight Loss

- The Body becomes a fat burning machine
- HIIT Makes the entire body work
- Lose weight while you rest
- What about calories
- When and what to eat
- Targeting those problem areas

Detoxification Pathways



The Body becomes a fat burning machine



HIIT MAKES Body Work

- Reduce oxygen supply and increase blood carbon dioxide
- Increased body temperature
- Reduced available fuels stores-low blood sugar
- Reduced body fluids-dehydration
- Tissue damage-injury

Lose Weight While you Rest

- Homeostasis

What about Calories

- Caloric Burn based on the intensity of the activity and the body weight of the person

Activity	125	150	175	200	225	250	275	300	325	350	375	400
Resting	100	120	140	160	180	200	220	240	260	280	300	320
Walking	110	130	150	170	190	210	230	250	270	290	310	330
Swimming	120	140	160	180	200	220	240	260	280	300	320	340
Light housework	130	150	170	190	210	230	250	270	290	310	330	350
Light exercise	140	160	180	200	220	240	260	280	300	320	340	360
Light walking	150	170	190	210	230	250	270	290	310	330	350	370
Light gardening	160	180	200	220	240	260	280	300	320	340	360	380
Light cleaning	170	190	210	230	250	270	290	310	330	350	370	390
Light yard work	180	200	220	240	260	280	300	320	340	360	380	400
Light housework	190	210	230	250	270	290	310	330	350	370	390	410
Light exercise	200	220	240	260	280	300	320	340	360	380	400	420
Light walking	210	230	250	270	290	310	330	350	370	390	410	430
Light gardening	220	240	260	280	300	320	340	360	380	400	420	440
Light cleaning	230	250	270	290	310	330	350	370	390	410	430	450
Light yard work	240	260	280	300	320	340	360	380	400	420	440	460
Light housework	250	270	290	310	330	350	370	390	410	430	450	470
Light exercise	260	280	300	320	340	360	380	400	420	440	460	480
Light walking	270	290	310	330	350	370	390	410	430	450	470	490
Light gardening	280	300	320	340	360	380	400	420	440	460	480	500
Light cleaning	290	310	330	350	370	390	410	430	450	470	490	510
Light yard work	300	320	340	360	380	400	420	440	460	480	500	520
Light housework	310	330	350	370	390	410	430	450	470	490	510	530
Light exercise	320	340	360	380	400	420	440	460	480	500	520	540
Light walking	330	350	370	390	410	430	450	470	490	510	530	550
Light gardening	340	360	380	400	420	440	460	480	500	520	540	560
Light cleaning	350	370	390	410	430	450	470	490	510	530	550	570
Light yard work	360	380	400	420	440	460	480	500	520	540	560	580
Light housework	370	390	410	430	450	470	490	510	530	550	570	590
Light exercise	380	400	420	440	460	480	500	520	540	560	580	600
Light walking	390	410	430	450	470	490	510	530	550	570	590	610
Light gardening	400	420	440	460	480	500	520	540	560	580	600	620
Light cleaning	410	430	450	470	490	510	530	550	570	590	610	630
Light yard work	420	440	460	480	500	520	540	560	580	600	620	640
Light housework	430	450	470	490	510	530	550	570	590	610	630	650
Light exercise	440	460	480	500	520	540	560	580	600	620	640	660
Light walking	450	470	490	510	530	550	570	590	610	630	650	670
Light gardening	460	480	500	520	540	560	580	600	620	640	660	680
Light cleaning	470	490	510	530	550	570	590	610	630	650	670	690
Light yard work	480	500	520	540	560	580	600	620	640	660	680	700
Light housework	490	510	530	550	570	590	610	630	650	670	690	710
Light exercise	500	520	540	560	580	600	620	640	660	680	700	720
Light walking	510	530	550	570	590	610	630	650	670	690	710	730
Light gardening	520	540	560	580	600	620	640	660	680	700	720	740
Light cleaning	530	550	570	590	610	630	650	670	690	710	730	750
Light yard work	540	560	580	600	620	640	660	680	700	720	740	760
Light housework	550	570	590	610	630	650	670	690	710	730	750	770
Light exercise	560	580	600	620	640	660	680	700	720	740	760	780
Light walking	570	590	610	630	650	670	690	710	730	750	770	790
Light gardening	580	600	620	640	660	680	700	720	740	760	780	800
Light cleaning	590	610	630	650	670	690	710	730	750	770	790	810
Light yard work	600	620	640	660	680	700	720	740	760	780	800	820
Light housework	610	630	650	670	690	710	730	750	770	790	810	830
Light exercise	620	640	660	680	700	720	740	760	780	800	820	840
Light walking	630	650	670	690	710	730	750	770	790	810	830	850
Light gardening	640	660	680	700	720	740	760	780	800	820	840	860
Light cleaning	650	670	690	710	730	750	770	790	810	830	850	870
Light yard work	660	680	700	720	740	760	780	800	820	840	860	880
Light housework	670	690	710	730	750	770	790	810	830	850	870	890
Light exercise	680	700	720	740	760	780	800	820	840	860	880	900
Light walking	690	710	730	750	770	790	810	830	850	870	890	910
Light gardening	700	720	740	760	780	800	820	840	860	880	900	920
Light cleaning	710	730	750	770	790	810	830	850	870	890	910	930
Light yard work	720	740	760	780	800	820	840	860	880	900	920	940
Light housework	730	750	770	790	810	830	850	870	890	910	930	950
Light exercise	740	760	780	800	820	840	860	880	900	920	940	960
Light walking	750	770	790	810	830	850	870	890	910	930	950	970
Light gardening	760	780	800	820	840	860	880	900	920	940	960	980
Light cleaning	770	790	810	830	850	870	890	910	930	950	970	990
Light yard work	780	800	820	840	860	880	900	920	940	960	980	1000

To Burn

- 300 Calories
- 400 Calories
- 500 Calories

When and What

- 1-1.5 hours before Workout
- Do not eat immediately after
- Numerous meals are better than 3 regular

Targeting those Areas

- Proper Form and Technique
- Belly fat

CHAPTER 5: HIIT and Cardio

- Make any cardio activity a HIIT Workout
- Sample Cardio Workouts

Make Cardio HIIT

- 5 days-45 minutes
- 3 days-20-30 minutes
- Burns fat without turning to protein synthesis for energy

Which Body is Best



Start

- 5 Min Warm Up
- Alternate High Intensity and moderate intensity over 10-20 minutes

Sample Cardio Workouts

- Work Seconds/Recovery Seconds

Easier

- Works Seconds/Recovery Seconds
 - 10/30
 - 15/45
 - 30/90
 - 60/180
 - 90/270
 - 120/360

Harder

- Works Seconds/Recovery Seconds
 - 10/20
 - 15/30
 - 30/60
 - 60/120
 - 90/180
 - 120/240

Hardest

- Works Seconds/Recovery Seconds
 - 10/10
 - 15/15
 - 30/30
 - 60/60
 - 90/90
 - 120/120

Killer

- Works Seconds/Recovery Seconds
 - 10/5
 - 15/8
 - 30/15
 - 60/30
 - 90/45
 - 120/60

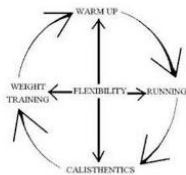
Sample Cardio Workouts

- | | |
|----------------------|-----------------|
| • Bicycling | • Stair Running |
| • Cardio Kickboxing | • Sprinting |
| • Elliptical Machine | • Swimming |
| • Jump Roping | • Treadmill |
| • Roller Blading | |
| • Running | |
| • Spinning | |
| • Sprinting | |

CHAPTER 6: HIIT And Cross Training

- Cross Training Workouts
- Scheduling Cross Training Sessions
- Choosing HIIT Workout Activities
- Sample HIIT Workout Progression

Cross Training Workouts



Cross Training Workouts

- **Core Strengthening**
 - Bicycle Crunch
 - Bridge
 - Single Leg Bridge
 - Lunge
 - Jume Lunge
 - Plank/Side Plank
 - Push up Lat Row

Cross Training Workouts

- o Cross Country Skiing
- o Deep Water Running
- o Kayaking
- o Kickboxing
- o Pilates
- o Rowing
- o Yoga

Scheduling Cross Training Sessions

- o Performed 3 Times per Week
- o Morning vs Afternoon

Choosing HIIT Workouts Activities

- o Major Muscle Groups
- o Intervals

Sample Workout

Week	Warm-up	Work Interval (Max Intensity)	Recovery Interval (60-70% MHR)	Repeat	Cool Down	Total Workout Time
1	5 min.	30 sec.	2 min.	2 times	5 min.	15 min.
2	5 min.	30 sec.	2 min.	3 times	5 min.	17.5 min.
3	5 min.	30 sec.	2 min.	4 times	5 min.	20 min.
4	5 min.	1 min.	4 min.	2 times	5 min.	20 min.
5	5 min.	1 min.	4 min.	3 times	5 min.	25 min.
6	5 min.	1 min.	4 min.	4 times	5 min.	30 min.
7	5 min.	1.5 min.	4 min.	2 times	5 min.	24 min.
8	5 min.	1.5 min.	4 min.	3 times	5 min.	26.5 min.
9	5 min.	1.5 min.	4 min.	4 times	5 min.	32 min.
10	5 min.	2 min.	5 min.	2 times	5 min.	24 min.
11	5 min.	2 min.	5 min.	3 times	5 min.	31 min.

CHAPTER 7: HIIT And Endurance

- What is improved Endurance
- How HIIT Benefits Overall Endurance
- HIIT Programs For Different Types of Endurance
- How Much is Too Much

What is Improved Endurance

- Is the ability of both cardiac or skeletal muscles and the entire musculoskeletal system to sustain or generate a force over a period of time.

Long Term Endurance

- Depends on aerobic metabolism

Short Term Endurance

- Depends on anaerobic metabolism

Progressive Endurance Training

- Designed to cause adaptations to the actual heart muscle

HIIT Benefits Overall Endurance

- Less time
- V02 Max
- Mitochondria
- Increase in Fatty Acid Oxidation
- More Efficient Calorie Burn After Exercise

Different Types of Endurance

- Power Athlete
- Endurance Athlete

How Much is Too Much

- Overtraining Syndrome
- Rest Days

CHAPTER 8: HIIT and Weight Lifting

- Incorporating HIIT into a Weight Workout
- How HIIT Cardio Boosts Weight Training
- A Word About Nutritional Supplements

Incorporating HIIT into a Weight Workout

- Warm Up
- Performance Training
- Recovery Phase

CHAPTER 9: Sample Exercises and How to Perform Them

- Exercise Options for HIIT
 - Dynamic Warm Up
 - Level 1
 - Level 2
 - Level 3
 - Upper Body
 - Lower Body
 - Core

Dynamic Warm-Up

- Inner Thigh Mobility
- Peel with Reach
- Hip Flexor Release to Walking Lunge
- Calf and Ankle Mobility
- Upper Back Rotation
- Kneeling Push Up

Level 1 Routine

Level 2 Routine

Level 3 Routine

Upper Body Exercise

Lower Body Exercise

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Sample-30 Minute Workout

Day 1 - Lower Body Day	Day 2 - Upper Body Day	Day 3 - Core Day
Warm Up	Warm Up	Warm Up
Lower Body Foundation moves	Upper Body Foundation Moves	Core Foundation Moves
Max interval and mixed interval - Focus on core, upper body, cardio	Max interval and mixed interval - Focus on lower body, core, cardio	Max interval and Mixed Interval - Focus on lower body, upper body, cardio
Game	Game	Game
Challenge	Challenge	Challenge
CoolDown	CoolDown	Cool Down

Take home points:

1. As little as six sessions of HIIT over two weeks, or a total of only around 15 minutes of very intense exercise (a cumulative energy expenditure of ~600 kJ or ~143 kcal), can increase oxidative capacity in skeletal muscle and improve performance during tasks that rely mainly on aerobic energy metabolism (Gibala, 2007)

Take home points:

2. Major changes in body composition can result from incorporating HIIT into a client/athletes program due to many reasons, particularly around improvements in insulin sensitivity.
3. It can add fun and variety into an exercise program that lacks intensity.

Questions?
