Endurance Factor

Sample

Introduction

Congratulations on completing your Metabolic Profile! Until recently, this type of assessment was available only to human performance labs and training centers for elite athletes where it's recognized as the "Gold Standard" for determining fitness and developing conditioning programs to improve performance. Now Endurance Facor is making these technologies and individualized training programs available to the "everyday athlete" who is "training for life" whether for weight loss, cardio fitness, or athletic performance.

During your exercise assessment the intensity level (work rate) was increasing each minute while the New Leaf Metabolic Profiler was analyzing the composition of every breath (oxygen and carbon dioxide) and monitoring your heart rate. Based on this assessment, your unique response to exercise was mapped to create a metabolic profile. The results include an objective measure of your fitness, a comparison to others of your age, and most importantly, all the information needed to create an effective Personal Exercise Program to help you meet your fitness goals.

Overview

The results of this assessment establish your unique metabolic profile and can be generally categorized into three areas:

1. Your body's maximum potential: Peak Oxygen Uptake or VO2 max

This value, known as peak oxygen uptake or VO2 max ("VO2" stands for Volume of O2 consumed per minute), represents the ability of your heart, lungs, and circulation to deliver oxygen to your exercising muscles. It is a gauge of the maximum amount of energy output or work your body can produce at peak performance. You only reach your VO2 max for a brief moment as you near exhaustion. Your VO2 max is determined by factors that include your current level of fitness, age, sex, body size, and heredity.

2. Your body's level of fitness or condition: Anaerobic Threshold or AT

The Anaerobic Threshold or AT represents how efficiently your muscles use oxygen to produce energy or work. As such, the AT represents the level of work your body can sustain over an extended period of time and is sometimes referred to as your "operational threshold". When your body is called upon to perform above your AT, lactic acid builds in the muscles creating fatigue (the burning sensation you feel) and your ability to continue to perform at this level will be very limited (a few seconds to a few minutes depending on how fit you are). You can improve your anaerobic threshold by training at the proper intensity of exercise and conditioning. The closer your AT is to your VO2 max, the better your level of fitness.

3. Other elements of your metabolic profile: Caloric Burn Rate & Fuel Type

Your metabolic profile yields two important variables. The first is your caloric burn rate or the number of calories your body burns during each minute of activity. To put your caloric burn rate into perspective, 3500 calories equates to 1 pound of fat. So if you want to lose 10 pounds, you'll need to increase the amount of exercise and/or reduce your food intake by a total of 35,000 calories to achieve your goal. The second is the Fuel Type your body uses at various exercise intensities. At lower intensities (aerobic), you primarily utilize fat for fuel. At higher intensities (anaerobic), your body shifts to a less efficient form of "quick energy" and uses carbohydrates (sugars) as its primary source of fuel. The metabolic profile enables you to determine your optimal fat and sustainable caloric burn zone (exercise heart rate) to effectively manage your energy expenditure.

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	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5	
	Lo	**Hi**	**Lo**	**Hi**	**Lo**	**Hi**	**Lo**	**Hi**	**Lo**	**Hi**
VO2/kg (mL/kg/min)	23	27	27	35	35	42	42	58	58	
Heart Rate (BPM)	130	141	141	159	159	172	172	181	181	191

	VO2 Peak	AT	%AT/VO2 Peak	%VO2 Peak/Pred
VO2/kg (mL/kg/min)	62.9	40.2	64	183
Heart Rate (BPM)	185	171	92	105

Heart Rate Training Zones Based on Metabolic Profile

Zone 1: Recovery (Active)

For the fit individual or competitive athlete, Zone 1 is used as active recovery when fatigued, sore or over-trained. You may be over-trained if your resting heart rate is elevated by 8-10 beats, you feel stale during a normal workout, or you just lack your usual energy level.

Zone 2: Endurance (Base)

Zone 2 is an aerobic zone of moderate intensity which improves your overall conditioning and enduance. The majority of your exercise time should be spent here. If your goal is to lose weight, Zone 2 is ideal since you can (or will be able to) exercise comfortably at this intensity for an extended period of time on a daily basis. If you are already a fit individual, Zone 2 is where you build an aerobic base.

Zone 3: Tempo (Race Pace)

Zone 3 is for the fit individual who can maintain Zone 2 for 30 minutes without undue fatique or soreness. Zone 3 promotes high intensity aerobic conditioning with an anaerobic component. Lactic acid is produced, but does not accumulate at a rate high enough to shut your aerobic system down. This zone will increase your tolerance to lactic acid and raise your Anaerobic Threshold. This is "race pace" training and may be performed for 20-40 minutes.

Zone 4: 2-Minute Interval (Speed Work)

Zone 4 is for the very fit individual or competitive athlete since this intensity is near peak VO2. Zone 4 increases speed and lactate tolerance and is designed for speed work and interval training. The number of intervals is determined by your recovery heart rate. When your recovery heart rate no longer drops to the original recovery rate of your first interval, you should end your training session. Each interval should be 30 seconds to 3 minutes in duration, followed by 1:1 or 1:2 recovery time.

Zone 5: 30-Second Interval (Peak Interval)

Zone 5 is for the most competitive of athletes and can only be tolerated for 20-30 seconds. The competitive athlete will probably incorporate this zone into their Zone 4 sprint workouts. Use caution with this zone because too much time spent at the high-end can lead to over-training or injury.

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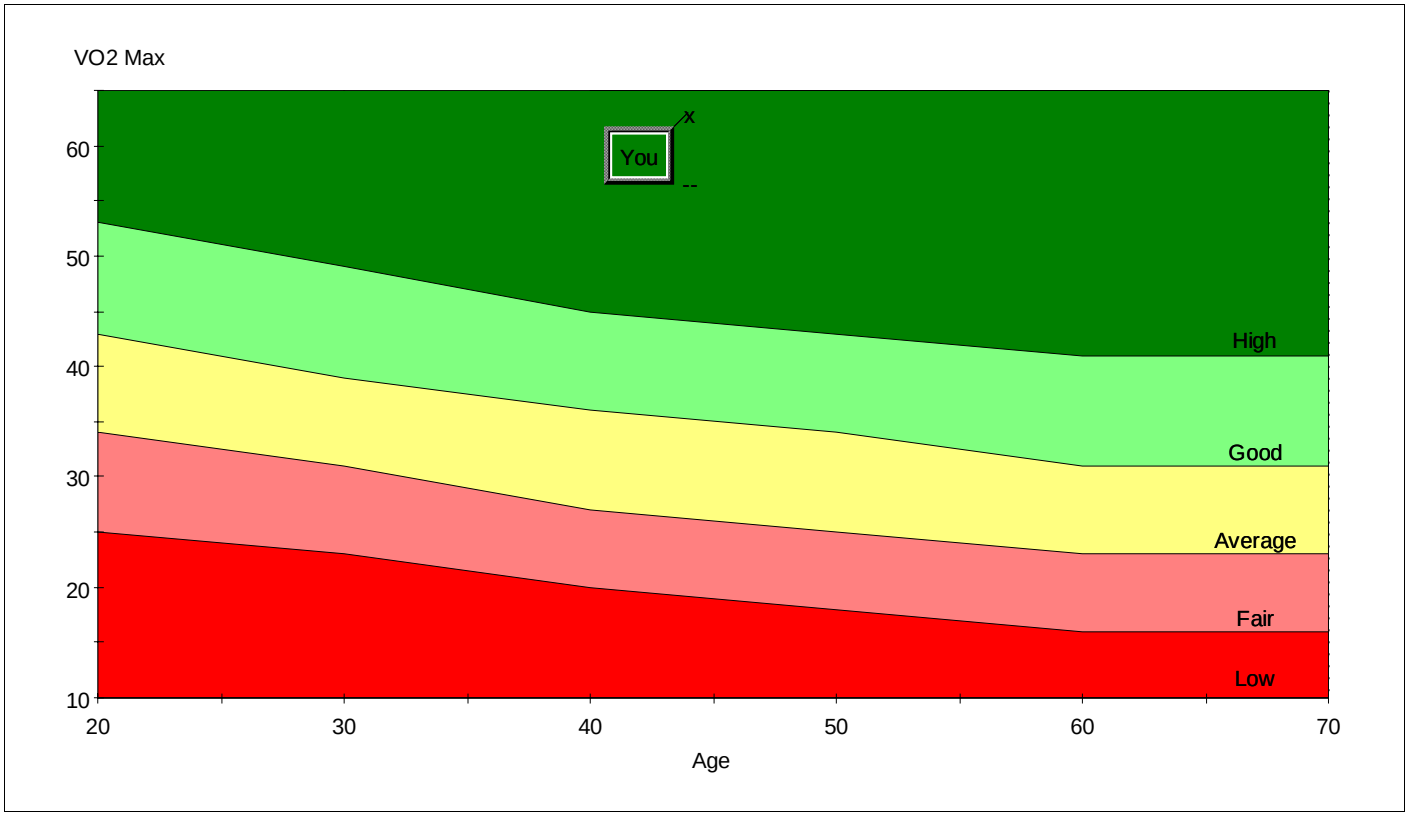
Comparison to Others

Below you can see how your current level of fitness compares with others your age and gender. Your Peak VO2 or projected VO2 max range is given below (in milliliters of oxygen consumed per minute for each kilogram of body weight). If you are just beginning an exercise program, this information will be used to set the proper intensity level for you to train your muscles to burn fat as a fuel (called "building base"). When you reach the intermediate stage and your exercise professional or personal trainer adjusts your exercise intensity and duration, you should see an increase in your VO2 max due to improved fitness and weight loss.

62.9



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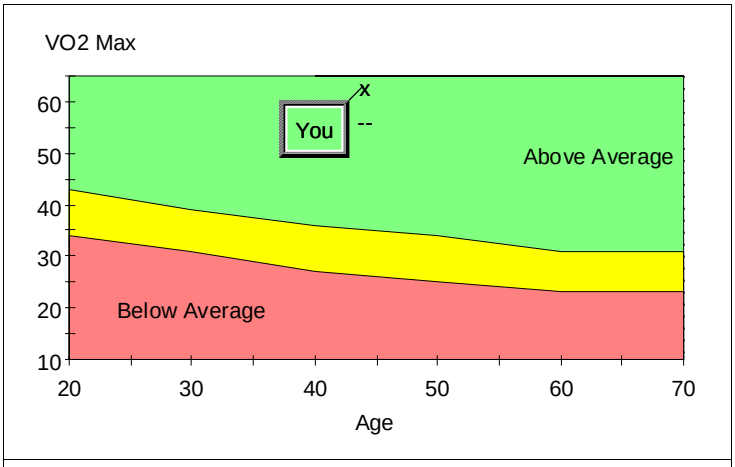
Your Metabolic Profile

Key elements of your exercise assessment are outlined below.

Peak VO2

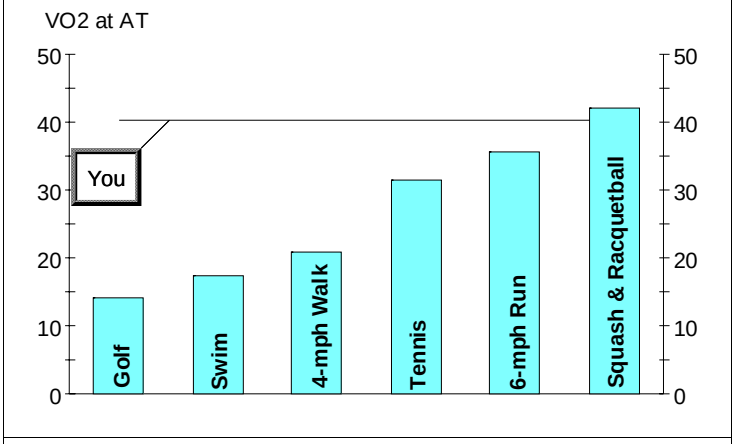
62.9

Your Peak VO2 or projected VO2 max range is given above (in milliliters of oxygen consumed per minute for each kilogram of body weight). VO2 max is the most effective measure of fitness and your body's maximum potential to perform work. It is impacted by (among other things) hereditary factors, your age, and health status. The graph on the right depicts how your VO2 max compares with others of your age and gender.



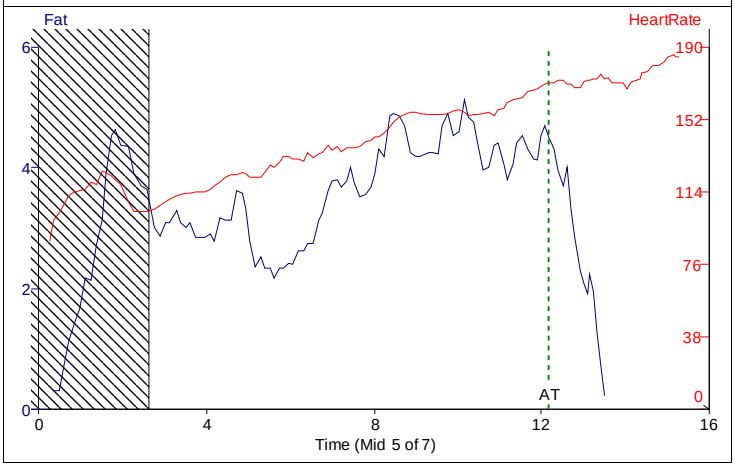
	Heart Rate	VO2	%Max
Anaerobic Threshold	**171**	**40.2**	**64**

The table above shows where your Anaerobic Threshold occurred in relation to your Heart Rate and as a percentage of your VO2 max. Typically, an Anaerobic Threshold of 65% or more of VO2 max represents above-average fitness while below 40% is considered deconditioned. Your Anaerobic Threshold also determines the type of recreational activities or sports in which you can comfortably participate at your current fitness level. Some examples are shown on the right.



	Total Calories	Fat Calories
Max Fat	**12.6**	**4.6**
Anaerobic Threshold	**15.8**	**4.5**

Key elements of your Metabolic Profile are depicted in the graph on the right. Remember that the exercise intensity was constantly increasing during your assessment. The graph shows the time (and consequently the exercise intensity) where you were burning the maximum fat calories, your Anaerobic Threshold (AT) point, and your Heart Rate response.



References: Graph 1 - A Handbook for Physicians American Heart Association, 1972;
Graph 2 - FJ Pashkow and WA Dafoe, Clinical Cardiac Rehabilitation: A Cardiologist's Guide, 1993.

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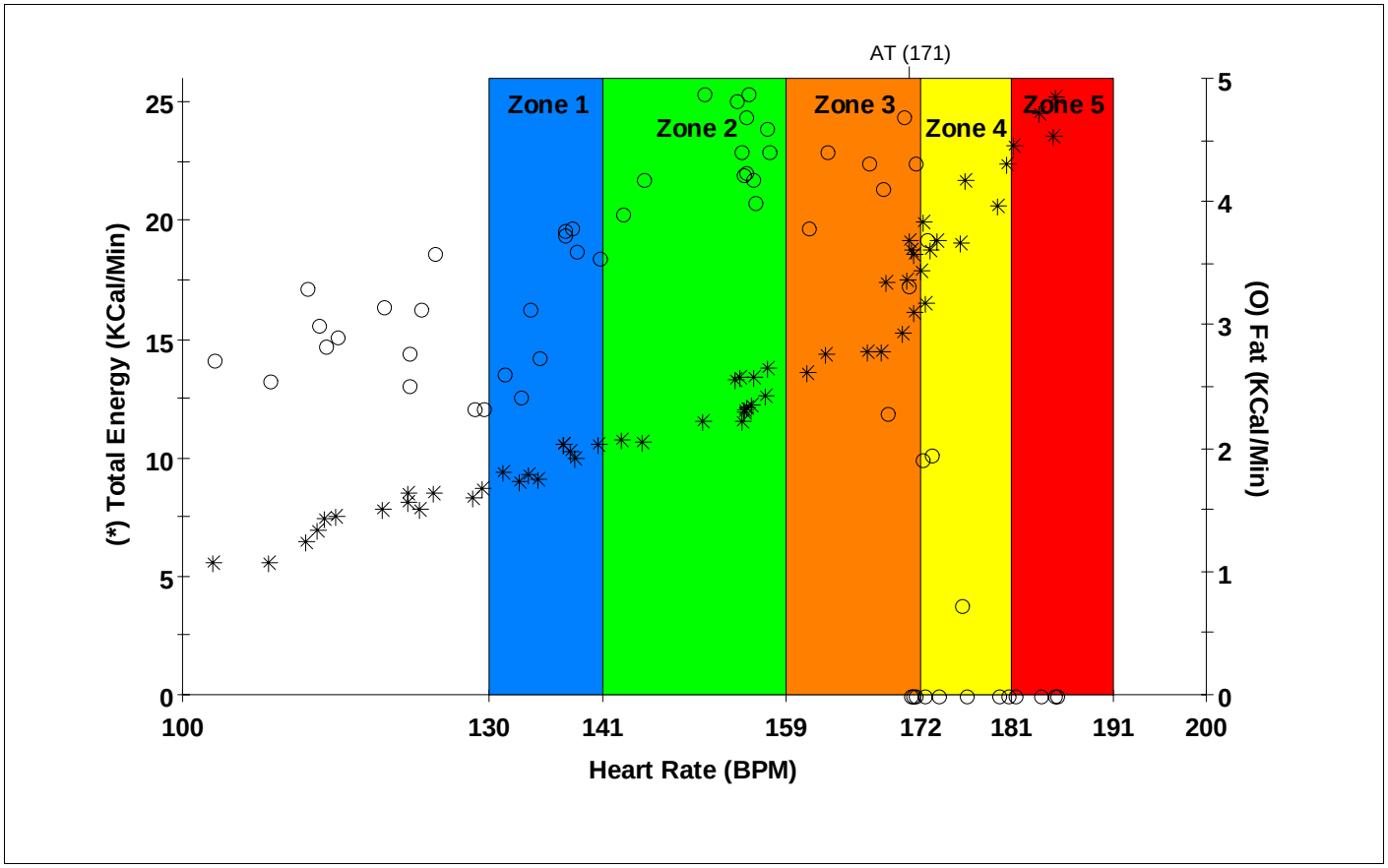

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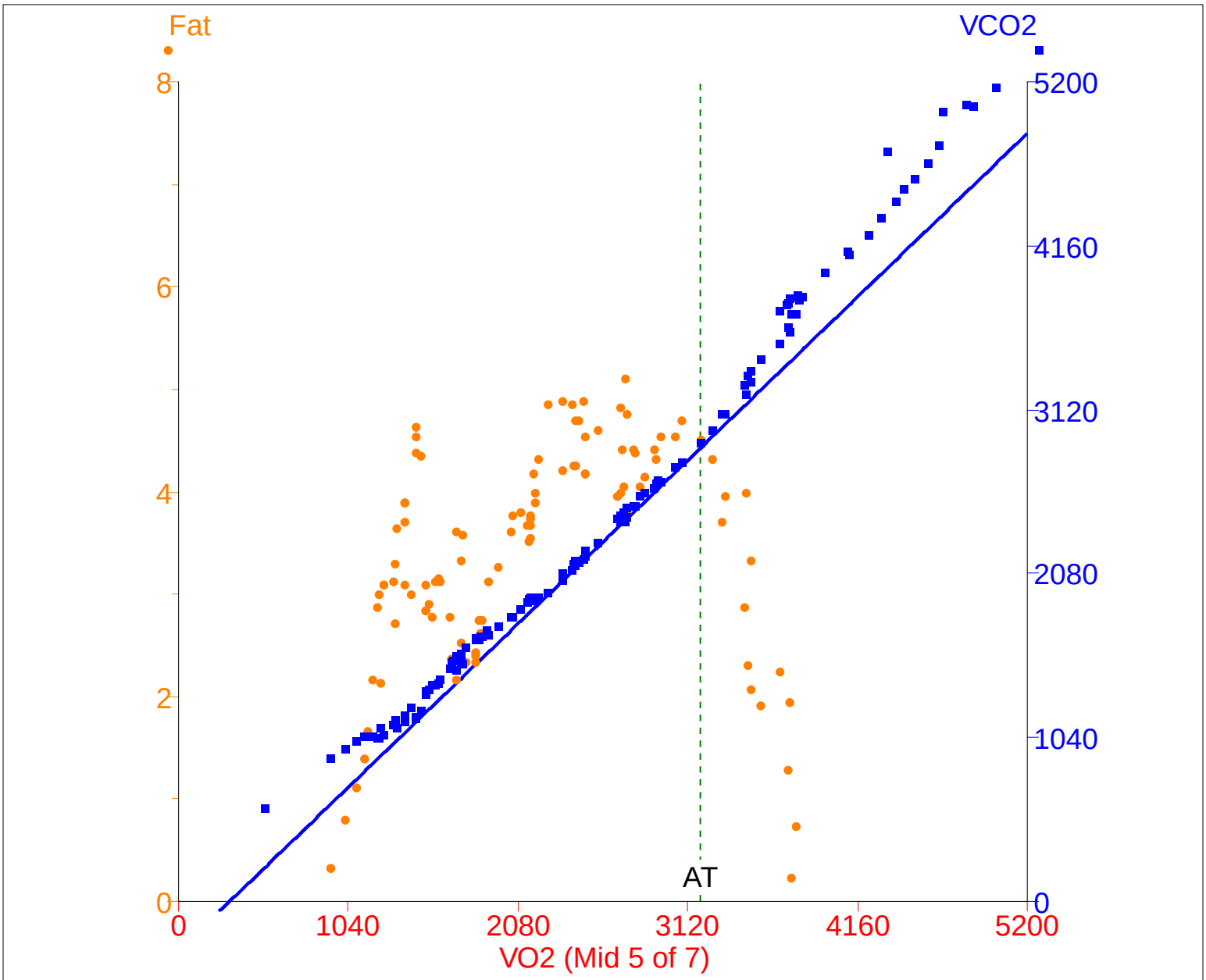

	Fat Max	Threshold	Peak VO2
Time (min)	10:02	12:12	15:07
VO2 (mL/kg/min)	32.4	40.2	62.9
RQ	0.89	0.91	1.03

	Fat Max	Threshold	Peak VO2
HeartRate (BPM)	157	171	185
Kcal (KCal/min)	12.6	15.8	25.2
Fat (Kcal/min)	4.6	4.5	
FAT/KCal (%)	36	29	

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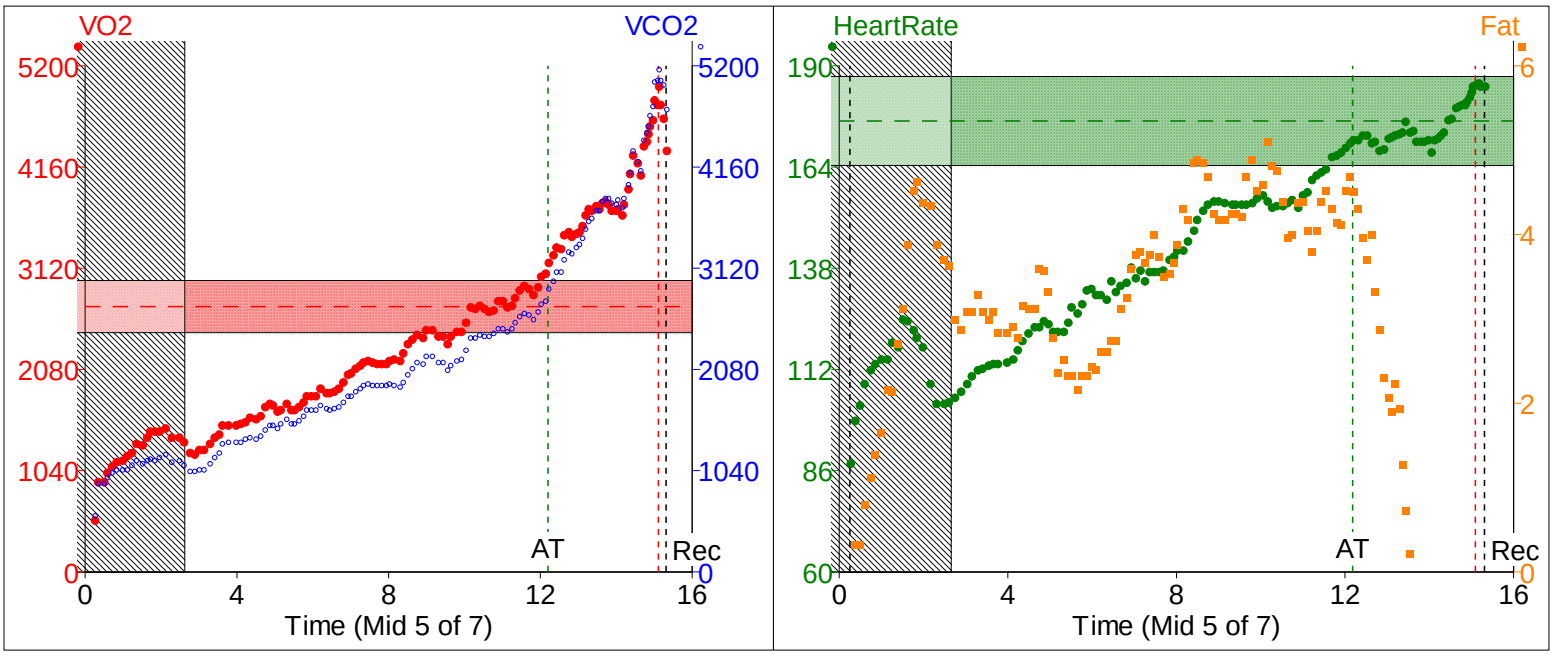

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Time (min)	VO2 (mL/kg/min)	VO2 (mL/min)	VO2/Pred (%)	VCO2 (mL/min)	RQ	HeartRate (BPM)	HR/Pred (%)	VE STPD (L/min)	Fat (Kcal/min)	Kcal (KCal/min)	FAT/KCal (%)	Work (Watts)
2:44	14.4	1140	42	970	0.85	103	59	20.4	2.7	5.5	49	60
2:52	14.5	1150	42	990	0.86	105	60	20.9	2.6	5.6	46	60
3:00	14.5	1150	42	990	0.86	108	62	20.9	2.6	5.6	46	60
3:07	15.7	1250	46	1055	0.84	110	63	22.0	3.1	6.1	51	80
3:16	16.8	1337	49	1130	0.85	112	64	23.9	3.3	6.5	51	80
3:23	17.2	1368	50	1183	0.86	113	64	24.8	3.0	6.7	44	80
3:30	17.9	1420	52	1232	0.87	113	64	25.5	3.0	6.9	43	80
3:37	19.0	1512	55	1318	0.87	114	65	27.3	3.1	7.4	42	80
3:45	19.1	1514	56	1336	0.88	114	65	27.8	2.8	7.4	38	80
3:57	19.1	1514	56	1336	0.88	114	65	27.8	2.8	7.4	38	80
4:06	19.2	1528	56	1346	0.88	115	65	27.5	2.9	7.5	39	100
4:12	19.5	1548	57	1374	0.89	117	67	27.9	2.8	7.6	37	100
4:20	20.0	1590	58	1392	0.88	119	68	28.4	3.2	7.8	41	100
4:28	19.8	1572	58	1376	0.88	122	69	28.4	3.1	7.7	41	100
4:36	20.2	1602	59	1406	0.88	123	70	28.8	3.1	7.9	40	100
4:43	21.4	1696	62	1470	0.87	123	70	29.9	3.6	8.3	44	100
4:50	21.9	1738	64	1514	0.87	125	71	30.9	3.6	8.5	42	100
4:57	21.7	1724	63	1516	0.88	124	70	31.5	3.3	8.5	39	100
5:02	20.9	1656	61	1482	0.89	122	69	31.2	2.8	8.2	34	100
5:09	21.0	1670	61	1522	0.91	122	69	32.1	2.4	8.3	29	120
5:18	21.8	1728	63	1570	0.91	122	69	33.0	2.5	8.5	30	120
5:24	21.1	1674	61	1528	0.91	124	71	32.5	2.3	8.3	28	120
5:30	21.1	1674	61	1528	0.91	128	73	32.5	2.3	8.3	28	120
5:37	21.4	1696	62	1560	0.92	127	72	33.3	2.2	8.4	26	120
5:44	22.1	1756	64	1610	0.92	129	73	34.4	2.3	8.7	27	120
5:50	22.9	1816	67	1670	0.92	133	75	35.6	2.3	9.0	26	120
5:57	22.9	1816	67	1664	0.92	133	75	35.6	2.4	9.0	27	120
6:04	22.9	1818	67	1668	0.92	131	75	35.6	2.4	9.0	27	140
6:11	23.8	1888	69	1724	0.91	131	75	36.4	2.6	9.3	28	140
6:20	23.3	1850	68	1686	0.91	130	74	35.9	2.6	9.1	29	140
6:25	23.2	1838	67	1666	0.91	135	77	35.3	2.7	9.1	30	140
6:33	23.4	1858	68	1686	0.91	132	75	35.1	2.7	9.2	30	140
6:40	23.9	1894	69	1698	0.90	134	76	35.0	3.1	9.3	34	140
6:47	24.6	1954	72	1750	0.90	135	76	35.8	3.3	9.6	34	140
6:54	25.6	2034	75	1808	0.89	138	79	37.0	3.6	10.0	36	140
7:00	25.8	2044	75	1808	0.88	136	77	37.5	3.8	10.0	38	140
7:07	26.4	2092	77	1854	0.89	138	78	38.5	3.8	10.3	37	160
7:13	26.8	2128	78	1898	0.89	135	77	39.8	3.7	10.5	35	160
7:20	27.1	2154	79	1918	0.89	137	78	40.6	3.8	10.6	36	160
7:27	27.5	2182	80	1932	0.89	137	78	41.1	4.0	10.7	37	160
7:33	27.1	2154	79	1920	0.89	137	78	40.6	3.7	10.6	35	160
7:41	27.0	2142	79	1922	0.90	138	78	40.6	3.5	10.6	33	160
7:48	27.1	2148	79	1926	0.90	141	80	40.4	3.5	10.6	34	160
7:55	27.1	2152	79	1922	0.89	141	80	40.0	3.7	10.6	35	160
8:01	27.4	2178	80	1934	0.89	143	81	40.3	3.9	10.7	36	160
8:08	27.7	2200	81	1930	0.88	143	81	40.5	4.3	10.8	40	180
8:16	27.4	2176	80	1914	0.88	145	82	40.1	4.2	10.7	39	180
8:23	28.5	2262	83	1958	0.87	148	84	41.0	4.9	11.1	44	180
8:29	29.6	2348	86	2042	0.87	151	86	42.6	4.9	11.5	43	180
8:37	30.3	2404	88	2100	0.87	153	87	44.0	4.9	11.8	41	180
8:44	30.9	2452	90	2158	0.88	155	88	45.1	4.7	12.0	39	180
8:53	30.4	2414	89	2148	0.89	156	88	44.9	4.3	11.9	36	180
8:59	31.3	2486	91	2224	0.89	156	88	46.1	4.2	12.2	34	180
9:07	31.3	2486	91	2224	0.89	155	88	46.1	4.2	12.2	34	200
9:18	30.6	2430	89	2164	0.89	155	88	45.0	4.3	12.0	36	200
9:24	30.6	2430	89	2164	0.89	155	88	45.0	4.3	12.0	36	200
9:32	29.6	2352	86	2088	0.89	155	88	43.2	4.2	11.6	37	200
9:38	30.6	2428	89	2134	0.88	155	88	43.9	4.7	11.9	39	200
9:47	31.2	2478	91	2172	0.88	155	88	44.7	4.9	12.1	40	200
9:54	31.3	2482	91	2198	0.89	156	89	45.0	4.5	12.2	37	200

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Time (min)	VO2 (mL/kg/min)	VO2 (mL/min)	VO2/Pred (%)	VCO2 (mL/min)	RQ	HeartRate (BPM)	HR/Pred (%)	VE STPD (L/min)	Fat (Kcal/min)	Kcal (KCal/min)	FAT/KCal (%)	Work (Watts)
10:02	32.4	2570	94	2282	0.89	157	89	46.5	4.6	12.6	36	200
10:09	34.4	2730	100	2410	0.88	156	88	48.6	5.1	13.4	38	220
10:16	34.1	2708	99	2406	0.89	154	88	49.0	4.8	13.3	36	220
10:23	34.6	2744	101	2446	0.89	154	88	50.3	4.8	13.5	35	220
10:30	34.1	2710	99	2434	0.90	154	88	50.5	4.4	13.4	33	220
10:38	33.8	2684	98	2436	0.91	155	88	50.7	4.0	13.3	30	220
10:45	34.1	2704	99	2454	0.91	156	89	51.1	4.0	13.4	30	220
10:52	35.1	2788	102	2514	0.90	154	88	52.0	4.4	13.8	32	220
10:59	35.1	2786	102	2510	0.90	157	89	52.2	4.4	13.7	32	220
11:06	34.3	2726	100	2472	0.91	158	90	51.5	4.1	13.5	30	220
11:13	34.5	2742	101	2504	0.91	161	91	51.5	3.8	13.6	28	240
11:19	35.6	2824	104	2570	0.91	162	92	52.5	4.1	14.0	29	240
11:26	36.6	2906	107	2630	0.91	163	93	53.7	4.4	14.3	31	240
11:33	37.2	2950	108	2666	0.90	164	93	55.1	4.5	14.6	31	240
11:40	36.8	2922	107	2652	0.91	167	95	55.2	4.3	14.4	30	240
11:48	36.0	2856	105	2596	0.91	167	95	54.1	4.2	14.1	29	240
11:54	36.9	2932	108	2674	0.91	168	96	55.5	4.1	14.5	28	240
12:01	38.3	3038	111	2754	0.91	169	96	56.9	4.5	15.0	30	240
12:06	38.8	3080	113	2786	0.90	170	97	58.0	4.7	15.2	31	240
12:12	40.2	3194	117	2912	0.91	171	97	60.5	4.5	15.8	29	260
12:19	41.1	3264	120	2994	0.92	171	97	62.4	4.3	16.2	27	260
12:24	42.2	3348	123	3100	0.93	173	98	65.1	4.0	16.6	24	260
12:32	41.9	3326	122	3094	0.93	173	98	65.7	3.7	16.5	22	260
12:37	43.7	3472	127	3222	0.93	170	97	68.0	4.0	17.2	23	260
12:43	44.2	3506	129	3298	0.94	171	97	69.7	3.3	17.5	19	260
12:49	43.6	3462	127	3282	0.95	168	96	69.8	2.9	17.3	17	260
12:55	43.9	3484	128	3340	0.96	169	96	71.0	2.3	17.4	13	260
13:01	44.2	3506	129	3376	0.96	172	98	71.6	2.1	17.6	12	260
13:06	44.9	3562	131	3442	0.97	172	98	72.7	1.9	17.9	11	260
13:11	46.4	3682	135	3542	0.96	173	98	74.5	2.2	18.4	12	280
13:16	47.1	3742	137	3620	0.97	173	98	76.6	2.0	18.8	10	280
13:21	47.0	3728	137	3648	0.98	173	98	78.0	1.3	18.7	7	280
13:26	47.5	3774	138	3728	0.99	176	100	80.8	0.7	19.0	4	280
13:32	47.2	3744	137	3730	1.00	173	99	81.9	0.2	18.9	1	280
13:37	47.8	3796	139	3818	1.01	174	99	84.5		19.2		280
13:42	48.1	3816	140	3844	1.01	171	97	84.8		19.3		280
13:47	47.7	3784	139	3844	1.02	171	97	85.1		19.1		280
13:52	46.9	3726	137	3806	1.02	171	97	84.7		18.8		280
13:58	46.8	3716	136	3790	1.02	171	97	84.1		18.8		280
14:02	47.1	3742	137	3838	1.03	168	96	84.4		18.9		280
14:08	46.4	3682	135	3752	1.02	171	97	82.2		18.6		280
14:12	47.7	3790	139	3854	1.02	172	98	83.4		19.1		300
14:17	49.8	3950	145	3998	1.01	172	98	86.6		19.9		300
14:21	51.6	4098	150	4114	1.00	173	98	89.4		20.7		300
14:26	54.1	4298	158	4342	1.01	176	100	95.2		21.7		300
14:32	53.1	4216	155	4234	1.00	177	100	93.0		21.3		300
14:37	51.6	4092	150	4134	1.01	180	102	92.1		20.7		300
14:42	55.3	4386	161	4446	1.01	180	102	98.2		22.1		300
14:46	55.9	4436	163	4530	1.02	180	103	98.9		22.4		300
14:50	56.8	4508	165	4594	1.02	180	103	102.1		22.8		300
14:53	57.8	4588	168	4696	1.02	181	103	106.9		23.2		300
14:57	58.6	4654	171	4802	1.03	182	104	111.4		23.5		300
15:00	61.2	4858	178	5048	1.04	184	104	119.8		24.5		300
15:03	60.7	4820	177	5058	1.05	185	105	124.7		24.3		300
15:07	62.9	4996	183	5170	1.03	185	105	123.6		25.2		300
15:10	60.7	4820	177	5058	1.05	186	106	124.7		24.3		320
15:14	58.9	4672	171	5022	1.07	185	105	126.2		23.6		320
15:19	54.7	4340	159	4762	1.10	185	105	120.6		21.9		320