

Qwave.com

Training and lifestyle monitoring

Qwave is an easy-to-use online application for professional heart beat analysis to support diverse aspects of well-being. The solution is developed for the needs of work-related research, occupational and preventive healthcare and applied physiological research. Qwave is designed for applied research and field measurements in which accurate information on physiology is needed but intrusive methods are not feasible.

Slav Danev
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SUMMARY

Qwave's interactive software delivers a workout routine designed specifically to match your goals, ability, age, gender and experience level. Just like having your own personal trainer, this intelligent system uses your results to adjust your program and guide you toward your fitness goals.

Qwave combine two separate services:

Workout and Nutrition Tracking

Qwave consists of four logs to track your personal fitness information. They are the Workouts Log, Nutrition Log, Personal Measurements Log and the Daily Journal.

Use the Workout Log to track your weight-training, sports or cardiovascular workouts. You will be able to calculate calories burned and track information such as sets, reps, weight, duration, calories burned, distance, speed, heart rate or intensity.

Training (Exercise) Performance – Heart Rate Belt needed

It is a online application for professional use in sports testing, coaching, individual athlete and team performance analysis. You can measure your physical workload, daily stress reaction and recovery, effectiveness of fitness training and EPOC

Your Success Starts Here

Qwave is designed to provide a simple, painless method of tracking your exercises, workouts, diet, and weight loss. Fitness Journal is easy to learn and takes minutes a day to maintain.

It can be difficult to stay on track with any diet or workout plan. Fitness Journal empowers you with a new level of clarity and personal understanding that will make it possible to successfully see your goals through to completion, no matter how large and impossible they may at first appear.

Your fitness journal is a series of easy to use, web based utilities that work in harmony to provide a better understanding of your past, present, and future.

Since everyone has a different way of doing things, there is no strict guideline regarding which tools you must use, how often you update, or how much information you need to include. This is your journal and you are free to use it in the way that best suits your lifestyle.

Tracking your personal progress on a daily basis - setting long-term goals and following through is an incredibly rewarding experience. It takes determination and endurance to finish what you start. Including Fitness Journal into your plan will make it easy to see your own progress on a daily basis.

Workout and Nutrition Logs

Qwave consists of four logs to track your personal fitness information. They are the Workouts Log, Nutrition Log, Personal Measurements Log and the Daily Journal.

Use the Workout Log to track your weight-training, sports or cardiovascular workouts. You will be able to calculate calories burned and track information such as sets, reps, weight, duration, calories burned, distance, speed, heart rate or intensity.

Use the Nutrition Log to keep track of all your nutrition information. You will be able to calculate calories consumed, track details on over 70 nutrients and set daily nutrition goals.

Use the Personal Measurements Log to track your personal measurements such as your body

weight, body fat, waist size, chest size, etc. You can also track your exercise maximums. For example, you could track your one rep max for bench press, squat, deadlift, etc. You can also set personal measurement goals.

Use the Daily Journal to keep daily notes about anything you wish. For example, you could keep notes on information such as how you felt during your workout, what the weather was like, how much sleep you had the night before, etc.

Personal Accounting Applied to Health and Fitness

Accounting has been a part of running a strong business for hundreds of years. It is important to keep track of your inventory, staff, debt, and balances.

More recently, personal accounting software has become a part of every day life. The benefits of tracking and planning your finances with charts and graphs, running reports and detailed analysis beats out a simple checkbook or simple guessing any day of the week. Personal accounting software empowers the end user, allowing vision and ideas where before there was only data.

Personal accounting has become so popular that we now crave this type of clarity and vision beyond our financial lives.

If charting and graphing finances allows me an enhanced vision of my finances, why can't I apply the same types of reports to other areas of my life, such as my health?

Qwave allows you to see track your health and fitness, the same way you might track your finances or bank account. The simple act of recording and reviewing your personal health statistics can make a dramatic difference on your perception of yourself and your future.

The Fitness Secret: Staying In Touch With Your Goals

Setting goals is easy. Anyone can sit down and make a list of what they wish to accomplish in the short and long term. It is much harder to see your initial goals through to completion. Why do so many people set goals yet fail to achieve the results they expected?

The key to successful goal implementation is to keep your initial desires and motivations fresh in your mind. By reviewing your progress each and every day, your goals become more than just wishful thinking and become engrained into your mind. Daily reflection, as if by magic,

turns dreams into reality. You will become what you think about most.

You are capable of achieving goals beyond anything you can even imagine. All it takes is the desire to try and the persistence to keep trying until you finally succeed. Fitness Journal is designed to help you succeed. We believe that success should be recorded.

Major Benefits:

1. Motivates you to exercise and eat healthy.
2. Helps you reach goals faster.
3. Keeps you organized.
4. Makes it easy to stick to any diet or workout routine.
5. Know if your diet and workouts are effective.
6. Easily track and visualize progress.
7. Prevents you from missing and duplicating workouts.
8. Faster and more accurate than paper logs.

Qwave Features:

- Easy tracking of your workouts, nutrition, and personal measurements (e.g., body weight, bench press max, etc.).
- Keep track of your calories burned and calories consumed.
- Use the Daily Journal to record any information that may affect your workouts.
- View and analyze your fitness information in charts.
- Print detailed reports of your fitness information.
- Export your charts and reports to many popular formats for use in another program or document.
- Qwave workout, meal and measurement templates so complete workouts, meals and measurements can effortlessly be entered into Qwave.
- Choose from 100 professionally pre-designed strength training programs that can be downloaded and used with Qwave as workout templates.
- Print workout templates to take with you to the gym to record your workouts. When you get home, you can transfer your completed information (e.g., special notes, weights used, etc.) into Qwave.
- Copy your current day's workout, meal, or measurement information to multiple day's for easy planning.
- Print blank workout, nutrition and measurement sheets to take with you anywhere to record your information.

- Choose from a list of over 1200 exercises when entering your workouts. You can also add or delete your own exercises.
- Complete explanations on how to perform many of the exercises.
- Choose from a list of over 50000+ food items when entering your meals. You can also add or delete your own food items.
- Keep track of over 70 nutrients.
- Create your own recipes.
- Set nutrition and measurement goals.
- Set up a separate file for as many users as you like. This is perfect for fitness professionals who want to track the programs and progress of their clients or for documenting and analyzing the exercise, nutrition, and fitness goals of friends and family.

DIET ORGANIZER

Qwave Diet Organizer is the most comprehensive diet and nutrition online software that gives you the tools to reach your weight goal by providing simple means of tracking your food and workouts, monitor your health and get clear assessments of your efforts and results. Qwave Diet Organizer will not burn calories for you, but it will eliminate any guesswork and help you make the right decisions to reach your objectives. It is also equipped with features to monitor specific nutrients, which is essential for people with food restrictions.

We have received many testimonies of customers who have used our online applications: people who lost weight (and a lot of it) and kept it off, people who now can accurately track their food to better control their medical condition, people who want to maintain their weight, etc.

Qwave Diet Organizer is a fast, easy-to-use calorie counter and diet diary. Whether you want to lose weight by calorie counting or optimize your diet and fitness routine Qwave Diet Organizer can help!

Count calories, record exercise, track body measurements and keep a daily journal. Use as a simple calorie counter or as a complete nutritional analysis tool.

Use with any weight loss plan to accurately track and record your diet and exercise. Just enter the foods you eat each day and let our diet software do all the calculations for you.

Instant summaries allow you to manage and plan your calorie intake to achieve weight loss. With user defined charts and reports you can monitor your progress.

Establish a complete diet plan

- Enter your profile and find out what your normal weight range exactly is.
- Choose your target weight and Qwave Diet Organizer will help you determine how long a healthy diet will take. Successful weight losses are achieved by making small, but long-lasting, changes.
- Select your diet plan (such as low carb) or create your own. Qwave Diet Organizer will later notify you whenever you select a food that does not match your diet plan (such as choosing food too rich in carbs while being on a low-carb diet).
- Set nutrients daily limits (minimum and/or maximum) on specific nutrients (such as carbs or fat) you need to watch for in order reach your daily goals and stay within your diet plan. You will be able to see in a chart how much you have consumed through your meals and how much you can (or not) consume further.
- Select your daily energy requirements for Qwave Diet Organizer to calculate the recommend percent daily values (%DV). You will be able to see whether you are missing, meeting or exceeding the %DV of the nutrients you're tracking.

Comprehensive meal entry

- Enter meals using 50000+ food items based on the USDA food database, along macro- and micro-nutrients (carbs, proteins, total fat, sodium, cholesterol, sugar, etc.) A powerful search lets you find foods in a split-second. Qwave Diet Organizer also keeps track of your favorite foods, making it super fast to build meals with the food you consume the most.
- For each food, see how much energy comes from carbs, proteins and fat. Qwave Diet Organizer will notify you whenever you select a food that does not match your diet plan (such as choosing food too rich in carbs while being on a low-carb diet).
- You can track water and enter meals using food group servings, which is best when consuming prepared foods.

- Add your own food with detailed nutritional information, either by weight (g/mg) or by percent Daily Value (%DV), making it a snap to enter custom foods if you have the nutritional facts (found on almost all food items)
- See a daily summary of each food you consume, with a list of nutrients you choose to track.
- Make it easy to count calorie.

Quick and easy monitoring and tracking

- The Results screen summarizes your accomplishments since the beginning of your diet regarding:
 - o Your current weight vs. how much you should weigh at the moment.
 - o Your eating habits (whether you consume too much or not enough food).
 - o Your exercising habits (whether you exercise enough or not).
 - o What to do to reach your weight goal in terms of eating and exercising.
- The day view shows a summary of calories (or kJ) or any nutrients you wish to track (such as carbs, sugar, etc). Quickly find out how much of them you consumed and eliminate any guesswork about how much you can still consume (or not) for the remaining of the day while staying within your limits.
- The day view also presents a diet summary that displays your weight trend from the start of your diet independently of the too-often discouraging but normal and usual daily weight fluctuations. The weight trend is what matters, not the daily fluctuations.
- The month view shows an immediate snapshot of your efforts overall: you can immediately see for any day if your weight is on track with your goal or not, helping you make a prompt assessment of your situation and take the right decisions.
- The report view presents useful summaries:
 - o Daily calories from BMR, workouts, allowed, meals and net.
 - o Daily nutrients consumption
 - o Nutrients (daily average)
- The chart view lets you visualize information for you to make the right decisions:
 - o Calories: consumption/expenditure, net and per hour.
 - o Vital signs: body weight, body fat, blood pressure and blood markers (e.g. cholesterol).

- o Water and nutrients consumption.
- o Workout duration, distance and heart rate.

Qwave Diet Organizer Features:

- Fast windows interface with full cut/copy/paste, undo/redo
- Direct spreadsheet entry, no slow dialogs or internet pages
- Smart search, searches as you type, shows the most likely items first.
- Automatic food favorites, keeps track of the foods you eat for fast selection
- Add new food definitions on the fly
- Create new foods from lists of ingredients (e.g. Peanut butter sandwich)
- Create menus (lists of foods, e.g. 'My Cereal Breakfast') for fast entry in a single operation
- Keep your Calorie counter data private (on your own PC), password protect your data.
- Tracks Calories and 31 Nutrients
- 50000+ food database, with multiple portion sizes
- 1200+ exercise database
- Weight and body measurement tracking
- Set nutritional goals
- Powerful charting and reporting
- Customizable food log, change nutrient columns, change colors...
- Includes calculators for BMI, Body Fat% and Metabolic Rate

Essential for people with food restrictions

- Enter daily limits (minimum or maximum) about nutrients that have a direct impact on your health, such as glucose, cholesterol, fiber, sugar, sodium, etc. Not only will this help to stay within your daily limits, but it is indispensable for anyone whose health highly depends on limiting the consumption of specific nutrients (e.g. diabetics, people with high cholesterol, people with high blood pressure, etc.) This is also useful for people that need to consume a minimum of specific nutrients, such as calcium.
- As you enter meals, Qwave Diet Organizer can show you how much of each nutrient you have consumed for the day, and whether you can consume more, have reached or exceeded the maximum (and by how much). This eliminates the guesswork about what you can or not eat for the rest of the day.
- Track blood work analysis and markers (such as cholesterol, triglyceride, etc). You can also instantly chart any blood marker over any period of time to see any important trends.

The screenshot displays the 'My Nutrition Log' interface for Tom Green on 2009-02-04. The top navigation bar includes Home, Workouts, Nutrition, Assessments, Reports, Fitness Tools, Profile, and My Account. The main content area is divided into several sections:

- My Nutrition Log:** Shows the user's name (Tom Green) and a search bar for food items.
- Food Log:** Lists three food entries:
 - 1 Fried Egg:** Meal: Breakfast, Serving Size: 1 of 1 Egg, Calories: 80, Fat: 45g, Carbs: 1g, Protein: 7g.
 - 2 eggs over easy:** by *varies, usually Target*. Meal: Breakfast, Serving Size: 1 of 100 grams (2 eggs), Calories: 140, Fat: 80g, Carbs: 2g, Protein: 12g.
 - 1 Pure Egg Spaghetti:** by *hazleton's Sconesfield*. Meal: Dinner, Serving Size: 1 of 2 oz, Calories: 210, Fat: 30g, Carbs: 34g, Protein: 8g.
- Calories by Type:** A pie chart and summary table showing:
 - 430 Calories (Goal is 2245 - 2745 cal)
 - 27g of Protein (Goal is 83 - 186 grams)
 - 37g of Carbs (Goal is 321 - 367 grams)
 - 145g of Fat (Goal is 76 - 87 grams)
- Water Tracker:** Shows a glass of water with '1' cups and a 'Save' button. A recommendation states: 'We recommend that you drink at least 8 cups of water a day. View Report.'
- Calendar:** A calendar for February 2009 with a legend for Training Activity, Stress Relief, Health Assessment, Food, Workout, and Body Tracker.

WORKOUT TRAINER

To feel better, have more energy and live longer, look no further than regular, old-fashioned, sweat-inducing exercise. By introducing a moderate amount of exercise into your daily life, you can significantly improve your overall health, well-being and quality of life. The health benefits of exercise can be achieved by virtually everyone, regardless of age, sex, race or physical ability. The merits of exercise - ranging from preventing chronic health conditions to boosting your confidence - are hard to ignore: regular physical activity helps extend life and improve its quality.

Qwave Workout Trainer is the premier health & fitness software for Windows Mobile Smartphone designed to track and improve your health & fitness, and to motivate you to exercise to achieve a healthy lifestyle, at a fraction of the cost of some sports equipment or gym membership.

Track cardiovascular and weight training workouts. Visualize your progress, judge the effectiveness of training, and reach goals sooner. Use it to train for road races, marathons and competitions, for personal training, or to stay in shape. Lets you record multiple workouts per day, includes nearly 400 exercises, and has all the features in Athlete's Database Gold.

Keep track of your strength training workouts with Qwave Workout Trainer. Simply print out a workout spreadsheet and take it to the gym with you. Use the spreadsheet to record your workout. Once you get home, enter your data into Qwave Workout Trainer to track your progress.

Simply enter your workout information into Qwave Workout Trainer and save the information. If you do the same workout more than once, you can create a workout template to save time. Then the next time you do the same or a similar workout, you simply open the template and edit the workout if there were any changes.

Track the information that matters to you

- For all workouts: duration, personal ratings, heart rate data, and notes.
- For cardio workouts: route, distance, pace, ascent and intervals.
- For strength workouts: location, warm-up, cool-down, exercises.
- For your health: calorie/kJ intake, weight, body fat, mood, sleep, blood pressure, resting heart rate and body measurements.

Track cardio and weight training workouts

- Great for running, cycling, in-line skating, kayaking and weight training.
- Record multiple weight training and cardiovascular workouts per day.
- Track average, resting and maximum heart rate.
- Track the difficulty of each workout and how you felt.
- Track weather conditions, routes, injuries and equipment.
- Track up to 200 splits per workout.
- Create and save predefined workouts (programs); enter future workouts in one mouse-click.
- Print weight training programs that you can take to the gym.
- Track equipment use (such as mileage on running shoes).
- Know when to replace running shoes, bicycle tires and clothing.
- Calculates calories burned for hundreds of exercises and activities.
- Includes nearly 1200 exercises (also let's you add an unlimited number of new ones).

Get motivated to exercise

- It calculates the calories/kJ and fat you burn - get instant gratification after your hard work.
- Use the month view to see all your workouts at-a-glance and appreciate your accomplishments.
- Use the report view to list key information and rewarding summaries.
- Use the chart view to see a variety of motivating charts to see your improvement over time.
- Plan your workouts to eliminate any guesswork about your fitness program and find time for exercising despite your busy schedule, thanks to a seamless integration with Pocket Calendar.
- See how much you've accomplished toward completing a long-term goal.

View progress with reports, charts, statistics and calendars

- Create line, bar, area, pie and moving average graphs.
- Compare data on multiple graphs simultaneously.
- Zoom feature lets you enlarge graphs up to ten times.
- Create comprehensive reports in text or Web (HTML) format.
- Full size color-coded calendar for viewing data by month and year.
- Calculates minimums, maximums, averages and totals for all data.
- Calculates total weight lifted by muscle group, for any date range.
- Calculates maximum weight lifted for each exercise, for any date range.
- Calculates mileage, number of uses and use time for equipment (like running shoes).
- Counts workouts, courses and routes you ran, days missed, etc.
- Summarizes all workouts by week and month.
- Filter lets you view specific types of workouts on graphs and charts.

My Workout Log | Exercise Search | My Goals | Trainings & Activities | Body Tracker | View Report

2009-02-04 [Previous Day](#) | [Today](#) | [Next Day](#)



My Workout Log
Tom Green

Search Workout SEARCH

February 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

- Training Activity
- Stress Relief
- Health Assessment
- Food
- Workout
- Body Tracker

Workout Log

[Click here to search for your activities.](#)



Barbell Bent Over Rows
Strength Exercise - [Strength Exercise](#)
Set: 1 Reps: 1 Weight: 25lb

[Info](#)
[Edit](#)
[Remove](#)

No Image

Push up - Knees
Exercise - [Strength Exercise](#)
Set: 2 Reps: 3

[Info](#)
[Edit](#)
[Remove](#)



Running - 10 mph
Cardio - [Running](#)
Calories Burned: 1056 Duration: 60min Distance: 10mi

[Info](#)
[Edit](#)
[Remove](#)



Running - 5 mph
Cardio - [Running](#)
Calories Burned: 530 Duration: 60min Distance: 5mi

[Info](#)
[Edit](#)
[Remove](#)



Snowboarding - moderate
Activity - [Winter Activities](#)
Calories Burned: 2004 Duration: 300min

[Info](#)
[Edit](#)
[Remove](#)

[Copy to Template](#), [Copy to another day](#), [View Reports](#)

Workout Templates

Test Template

[Add to Log](#) [Delete](#)

Favorite Workouts

[Snowboarding - moderate](#)

[Remove](#) [Add to Log](#)

HR Belt - Trainings & Activities

■ Physical Activity
Start Date: 2009-02-04 16:29, End Date: 2009-02-04 17:05, Duration: 36min
Calories Burned: 130, Training effect: 3.8

[Open](#)
[Delete](#)

My Goals | [Setup your Goals](#)

My Fitness Goals

Tom Green

[Setup your Goals](#)

Nutrition Goals

Net Calories Consumed / Day	2245 - 2745	Edit
Carbs / Day	321 g - 367 g	Edit
Fat / Day	76 g - 87 g	Edit
Protein / Day	83 g - 186 g	Edit

Workout Goals

Calories Burned / Day	Edit
Workout Minutes / Day	Edit

Body Goals

Body Weight	150lbs	Edit
Rest Heart Rate	65 bpm	Edit

TRACKING NUTRITION

Use the Nutrition Log to keep track of all your nutrition information. You will be able to calculate calories consumed and track details on over 70 nutrients.

You can create a set of meal templates for your most common meals. A meal template will save a lot of time in entering your meals especially if they are similar from day to day.

Qwave comes pre-loaded with a list of over 50000+ food items for easy meal entry. This list is supplied by the United States Department of Agriculture. You can also add or delete your own food items and create your own favorites food item list.

You can keep automated and detailed records of your calories, carbs, fats, etc, our detailed food log is for you. Our Nutrition log allows you to keep accurate nutritional information on the meals you eat. You can lookup foods in our online database of thousands of foods and add them to your library with the click of a button. You can also add your own custom foods to your food list. Each day will provide a complete nutritional break-down and a calorie balance sheet showing if you consumed or expended more energy. All calculations are automatic, You select what you ate from our list, we do the rest for you!

The most important reason to keep a food log is often overlooked. It is too easy to go through an entire day, mindlessly eating without giving a second thought to what you may be consuming. A fitness log makes you stop, once a day, and pay attention to what you consume. The simple act of paying attention to your eating habits is often all that is needed to initiate change in your own eating habits.

The Qwave Nutrition log allows you to track your meals and snacks, and rate each meal yourself. A little honesty goes a long way when it comes to diet, and most of us know when we are consuming junk, and when we are eating healthy.

Comprehensive meal entry

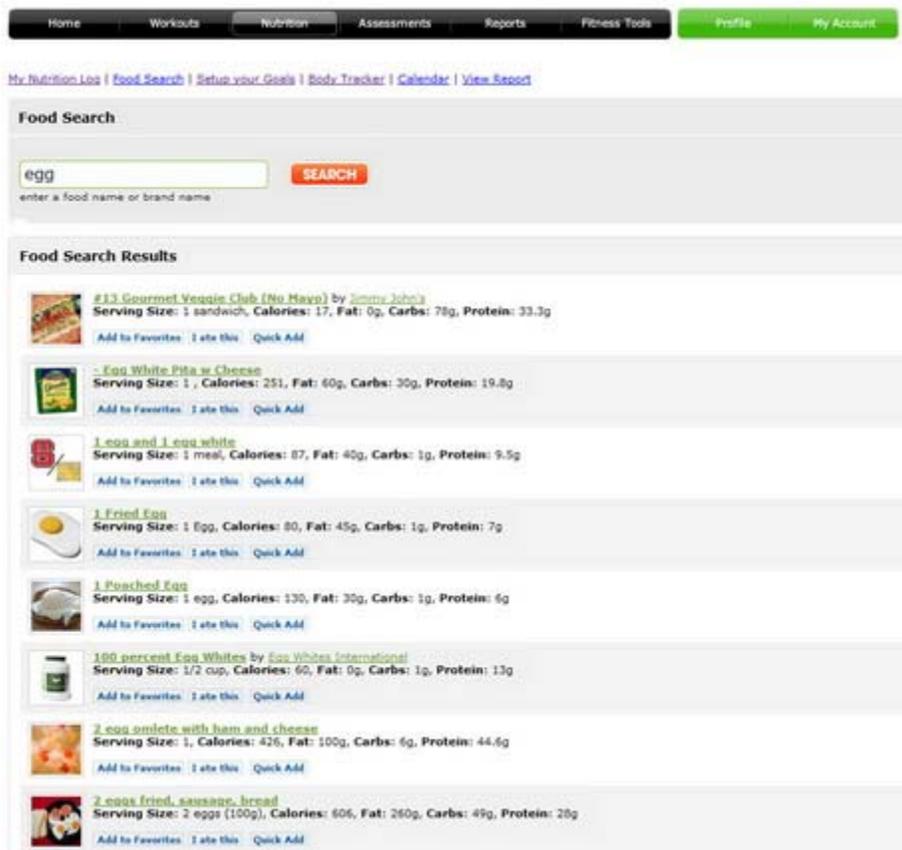
- Enter meals using 50000+ food items based on the USDA food database, along macro- and micro-nutrients (carbs, proteins, total fat, sodium, cholesterol, sugar, etc.) A powerful search lets you find foods in a split-second. Qwave Diet Organizer also keeps track of your favorite foods, making it super fast to build meals with the food you consume the most.

- For each food, see how much energy comes from carbs, proteins and fat. Qwave Diet Organizer will notify you whenever you select a food that does not match your diet plan (such as choosing food too rich in carbs while being on a low-carb diet).
- You can track water and enter meals using food group servings, which is best when consuming prepared foods.
- Add your own food with detailed nutritional information, either by weight (g/mg) or by percent Daily Value (%DV), making it a snap to enter custom foods if you have the nutritional facts (found on almost all food items)
- See a daily summary of each food you consume, with a list of nutrients you choose to track.
- Make it easy to count calorie.

The screenshot displays the Qwave Diet Organizer web application interface. At the top, there is a navigation bar with tabs for Home, Workouts, Nutrition, Assessments, Reports, Fitness Tools, Profile, and My Account. Below the navigation bar, the user's name "Tom Green" is displayed next to a search bar labeled "Search Food" and a "SEARCH" button. The "My Nutrition Log" section shows a calendar for February 2009 with a legend for Training Activity, Stress Relief, Health Assessment, Food, Workout, and Body Tracker. The "Food Log" section lists three items: "1 Fried Egg" (Calories: 85, Fat: 45g, Carbs: 1g, Protein: 7g), "2 eggs over easy by Yvonne, usually Target" (Calories: 140, Fat: 30g, Carbs: 2g, Protein: 12g), and "Pasta Egg Spaghetti by Nicoletano's Springfield" (Calories: 210, Fat: 20g, Carbs: 34g, Protein: 8g). Below the food log, there is a "Calories by Type" section with a pie chart and a table of nutritional data:

Calories by Type	Calories by Meal	Nutrition
430 Calories (Goal is 2245 - 2745 cal)		
27g of Protein (Goal is 83 - 106 grams)		
37g of Carbs (Goal is 321 - 367 grams)		
145g of Fat (Goal is 76 - 87 grams)		

The "Water Tracker" section shows a glass of water with "1" cups and a "Save" button. Below it, a message states: "We recommend that you drink at least 8 cups of water a day. View Report."



EXERCISE LOG

Use the Exercise Log to track your weight-training, sports or cardiovascular workouts. You will be able to calculate calories burned and track information such as sets, reps, weight, duration, calories burned, distance, speed, heart rate or intensity.

You can create a set of workout templates for your most common workouts. A workout template will save a lot of time entering your workouts especially if they are similar from week to week. Workout templates can be very flexible. For example, personal trainers could create a set of workout templates for their clients who also use our online application. Trainers could then send the workout templates to their clients via e-mail.

At the heart of Exercise Log is your personal workout journal. This tool allows you to keep record of every workout, every calorie burned, every mile you travel. Entering a completed workout into your workout journal is incredibly satisfying. You had a great workout. Take a

minute and record your results.

Customize your journal from a list of over 40 sports and activities. You only see the sports and options that you select. Track your 10,000 steps a day. Track your heart rate zones, record your distance in miles or kilometers. We provide lots of options. You select just the stuff you want. Your journal is flexible. You can change your settings at any time. If you need a sport that is not our list, just ask and we will add it for you.

Once you have added your favorite sports, you can start adding your daily workouts. As you add information, your journal will provide a summary of your hours, miles, calories, steps, etc.

Results You Can See

As you build up your database of workouts, you will be able to evaluate your results using monthly, weekly, and daily charts. Its easy to review your own workout performance based on your past history.

Exercise Log offers an entertaining, and educational view of your own workout history. Are you slacking, or on the edge of burning out? You will actually start to see your own working plan in a whole new light. You may find that based on your historic information you will have better results by adjusting your plan, or your goals.

Painless Workout Entry

Exercise Log is easy to learn and maintain. Most of the tools can be used without ever reading the instructions. You fill in the key information about your workout, and Qwave calculates the rest.

You have the option of writing a summary of your workout in the workout details box. You can also save this workout as a regular workout so you can call it up later and save time reporting this workout in the future.

With each workout you record, you will gain a clearer picture of your own fitness level. Having a complete understanding of your current fitness makes it easy to set goals for the future.

Plan Your Workouts In Advance

Schedule your activities days, weeks, or months in advance with our workout planning utility.

You can view your upcoming workouts or share your workout plans with your friends and workout partners using the friends sharing section. Get control of your entire training season from the very first day.

How You Use Your Exercise Log Is Up To You

Everyone has a different way they use their journal. Some athletes enter their information in once or more a day. Other athletes enter their information every few days or once a week. How and when you enter your information is up to you. In general, the more actively you participate in your own Exercise Log, the better you will understand your own goals. The more consistent you become with your entries, the greater your rate of success and the more motivated you will become to complete the goals you set.

Track the information that matters to you

- For all workouts: duration, personal ratings, heart rate data, and notes.
- For cardio workouts: route, distance, pace, ascent and intervals.
- For strength workouts: location, warm-up, cool-down, exercises.
- For your health: calorie/kJ intake, weight, body fat, mood, sleep, blood pressure, resting heart rate and body measurements.

Track cardio and weight training workouts

- Great for running, cycling, in-line skating, kayaking and weight training.
- Record multiple weight training and cardiovascular workouts per day.
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- Track up to 200 splits per workout.
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TRAINING(EXERCISE) PERFORMANCE – HEART RATE BELT

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With the help of the software, it is possible to assess

- * [Physical Workload](#)
- * [Daily Stress Reaction and Recovery](#)
- * [Health Promoting Effects of Physical Activity](#)
- * [Effectiveness of Fitness Training](#) and [EPOC](#)
- * [Energy Expenditure and Weight Management](#)

The analysis and reports created by the application need only one physiological signal – beat-by-beat heart rate data (R-R interval). The measurement can be carried out during normal daily routines (e.g. during normal workday, leisure time, walking, and sleeping). Although the data collection procedure is simple, the method can produce meaningful information.

Qwave and Fitness Programs

Whether you're an experienced athlete looking for a way to optimize your training program, or simply a beginner hoping to improve your shape, Qwave is there for you.

It is very important to see the effects that physical exercise have on your body, as well as to know what exercises are good or not for you. You may also determine the quality of your exercise. In just 3 minutes, Qwave's Fitness Test will show you your current fitness level which serves as an indicator of your body's fitness power and readiness for a physical workload. This indicator will help you to:

- Find your optimal physical workload before going to the gym.
- Avoid overtaxing your heart as well as other parts of your body.

Qwave will also allow you to track your progress with real time data that will show you how much strength (fitness) you are able to gain each exercise, for days, weeks, months, etc. Compare your fitness level with other athletes around the world, and see where you stand on the worldwide scale.

Optimize Your Training Program

Do a training session with Qwave's Belt and determine what workload is best for you at any given day or time. In some cases Qwave may advise you to stay home and rest or take a walk instead of doing your full workout.

For example, if you run a Fitness Test session and your fitness level turns out very low, Qwave may advise you not to proceed with your training exercise. Overtraining can lead to far-reaching stress consequences for your organism.

Please, keep in mind that a low fitness level is not just indicator of undertraining or overtraining, it is also influenced by levels of exhaustion and fatigue of your body.

Track Your Fitness Progress

You do your regular exercises, attend fitness classes, and manage your personal training program. However, are you aware of the progress you're making? What if your fitness program makes no difference to your actual fitness level? How often do you exercise? How do you know that the amount of time you spend on exercise is right for you?

Qwave's Fitness Test was designed for both well-trained athletes and beginners, to help them track their fitness progress over time. Take Fitness Test regularly and under similar conditions, e.g. every morning after you get out of the shower. This will better help determine the fitness progress you're making. You'll see the precise shift in your fitness level on a daily, weekly and monthly basis.

Fitness Test is recommended for personal and gym use.

Qwave and Gyms

Use Qwave Fitness Test software to track effectiveness of your fitness programs in your local gym. Measuring your fitness level before and after exercise directly provides information about

your progress.

Share your Fitness Test results with your personal trainer so that he/she can review your fitness reports from the training sessions you did at home, and provide you with the tips you need to improve.

In order for your personal trainer to have access to your data he/she needs to be part of Qwave's fitness program and you must have a personal Qwave system set up at home.

To join Qwave's fitness program contact your local fitness club representative or personal trainer.

Note: not all fitness clubs currently support Qwave's fitness program!

PHYSICAL WORKLOAD

Any physical activity may turn out to be too exhausting, no matter if it is your job or your exercise program. But if being a professional athlete is your job, then you know you've got to give your best.

But how much is your best and how do you achieve that? This is something everybody would like to know. How can you perform at your best without unexpected breakdowns? How do you tell the useful workload of your training activities from overtraining? In order to ensure adequate recovery of your body you must stick to diets and programs for getting just enough rest. And there is no guarantee that even professional athletes will have continuous optimal results. The human body has its limits and no one can perform well beyond a certain level.

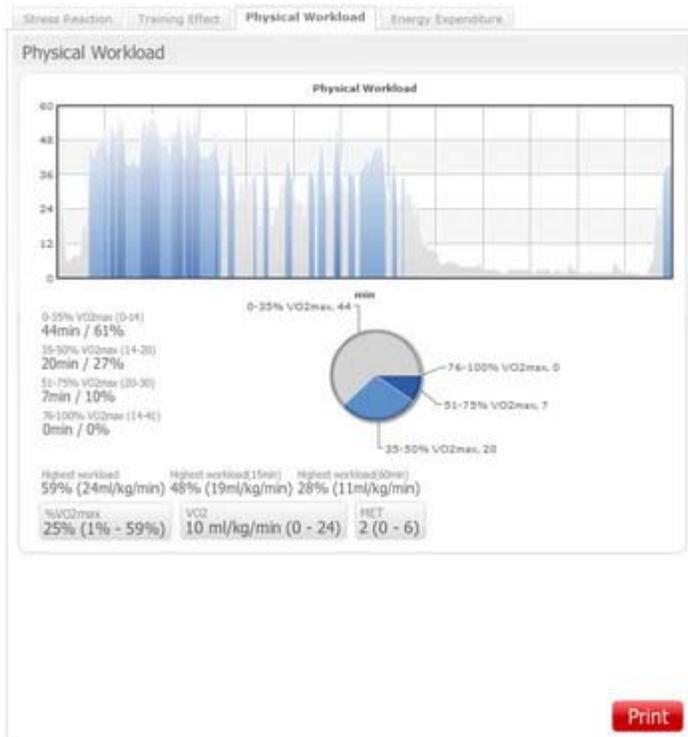
But how can you measure that level? How do you know how useful your exercise is? How do you know how much you've got? And are you really sure you make progress? All these are questions that Qwave can answer.

Qwave can assess the physical workload of your exercise. Regular monitoring with Qwave allows keeping records with your results. You will know when and how you made progress and observe when your results advance and decline in time. You can carefully choose which exercises to emphasize upon for more efficient training practices.

It doesn't matter if you are on the running track, or have the goal to lift as much as possible, you must filter out the exercises that yield better results and this is when Qwave can help. Observe the physical workload of your exercises in order to prepare fitness and training programs, customized especially for you.

Qwave's Physical workload assessment is a scientifically acknowledged method that involves Heart rate Measurements. The information that HRV provides forms of the basis of VO2max assessment, which is the indicator of physical workload. Heart rate measurements are taken for particular exercises or an entire training session. After data is analyzed, Physical Workload Reports are presented.

These reports may be used as History record for your training exercises. This would be vital information to customize your training program especially for your body. It doesn't matter if you are a professional athlete or just want to stay fit. In both cases it is results you would seek and knowing the physical workload of your exercises is an important step towards achieving your goals.



There are jobs and jobs. Some professions are physically demanding, whereas others require skills that require more concentration of the mind. In any case, work is energy-consuming. This means that no matter how well prepared you are for your job, you need to take enough rest and take care of yourself in the most appropriate possible way in order to guarantee your abilities to perform well in the future.

But nowadays our lives are so hectic and we often end up so professionally obsessed that we don't even have time to pay attention to ourselves. This may lead to long-term exhaustion and may even raise health-related issues. This is particularly dangerous with hazardous jobs and jobs that are physically more demanding.

Physical activities of an exhausted body carry risks of injuries, fatigue-related illnesses and even long-term disabilities. There are general recommendations about intensity limits at work (based on %VO₂max), which forms the basis for assessing physical workload.

How well are you?

Are you overloaded with work and tasks? Does sometimes work along with home chores obstruct you from taking enough rest? Have you got time for relaxing exercises and procedures?

There are numerous questions that bring one simple answer: Take care of yourself. You might not even begin to feel the difference before it is too late. Millions of people across the globe rarely find any time for themselves. When you are so busy and obsessed with work, you might actually "forget" about yourself.

Do not let this go on for too long. Don't wait for the "Too late" signal. Long-term exhaustion might lead to fatigue-related illnesses and could have severe consequences on the physical abilities of your body.

Qwave assesses your level of daily activity

Qwave can assess the physical abilities of your body. This assessment includes measuring your heart rate and the results are analyzed to determine your level of daily activity.

Heart rate measurements are taken on two days with similar activities. Measurements are recorded with a log that includes various information like work tasks, breaks, etc.; and even

daily events, like emotions of overload or recovery.

Generally momentary stress is considered a negative factor but this is not necessarily true. In fact, it might have positive effect on people and may help concentration and motivation. Usually momentary stress becomes problematic when the pressure becomes “too much” for a continuous period of time.

On the other hand, the “dark side of stress” might cause minor disturbances, such as lack of concentration (momentary stress). Nevertheless, momentary stress and lack of concentration could also bring some negative side-effects such as increased risk of occupational accidents.

Stress has two major aspects: momentary stress (stress reaction) and accumulative stress. Continuous increase of momentary stress leads to increase in long-term accumulative stress and health level

It is important to take care of momentary stress and make sure you do not accumulate stress in your body. Accumulative stress, if not treated, may grow to cause serious health issues and inabilities.

Recovering from stress plays an important role in your abilities to perform well in almost every aspect of your life: from doing well at work to doing well in your private life, or just “feeling alright”, if you prefer.

Stress and Recovery

Qwave offers monitoring sessions for stress and recovery. It enables general users to easily determine how their bodies response to stress factors. You may like to assess your momentary stress right after work; on the other hand, you could see how well you were able to relax during your vacation. You can observe when you are most stressed and when are you most relaxed.

Does work put too much stress on you? Do you get enough good sleep? Qwave provides answers to these two questions and you could use it to monitor the condition of your body.

Qwave momentary stress and recovery is a proven method that measures and analyzes your Heart Rate Variability (HRV) to figure out changes in the physiological functions and especially in the functioning of autonomic nervous system (ANS). All these are reflected in our heart. It is designed to distinguish ANS stress reactions caused by immediate physical demands and other factors, such as mental demands or stress.

The momentary stress and recovery analysis has been developed in collaboration with several research projects in the area of stress measurement and autonomic nervous system (ANS) function, applying also research in the fields of exercise physiology, behavioral sciences, and applied mathematics.

The Key benefits of Qwave for stress and recovery monitoring include:

- Objective evaluation of the momentary stress levels during the session
- Recognition of stress overload
- Identification of periods of stress and recovery in daily activities
- Recovery and resources follow-up
- Easily understandable reports

After measurements are taken, reports are prepared. For stress and recovery, Qwave offers two individual reports.

Available Reports:

- Stress Reaction Report
- Resources and Recovery Report

Qwave's Stress Reaction Report

The report illustrates the physiological reactions associated with stress and recovery during the session measurement. Periods of stress and recovery during a workday are analyzed and momentary stress management is evaluated.

These reports are suitable for everybody who is interested in getting individual measurement data of his/her body's stress reactions and relaxation periods during work and leisure time, and in monitoring lifestyle stress.

These Reports can be used for many applications, including:

- Monitoring time periods of high stress and recovery during a single day to identify peaks and of stress and recovery
- Monitoring of day-to-day stress and recovery
- Analysis of the stress load of diverse work tasks
- Analysis of measurements taken during leisure time to get an overall picture of stress and

recovery states

- Identification of high stress and recovery
- Planning of necessary changes in lifestyle
- Analysis of the influence of physical activity on stress
- Illustration of the balance between stress and recovery states

Qwave's Stress Reaction Report offers the following features:

- Momentary stress and recovery chart
- Analysis of periods with stress reactions (i.e. identify when the highest intensity of stress reactions occurred)
- Stress and recovery proportioned to an 8h working day
- Stress reaction and recovery follow-up

Qwave's Resources and Recovery Report

The changes in body's resources and the balance of stress and recovery states during the measurement period are analyzed and presented in reports.

Recovery is key to stress analysis, since insufficient daily recovery reduces work efficiency and overall well-being. By using this method, you can verify how well you are able to recover during a work-day and particularly after a good night sleep.

This report is suitable for everybody who is interested in getting individual and detailed information about his/her body's resources. This information is analyzed and presented in reports that show how the body is affected by stress reaction and recovery.

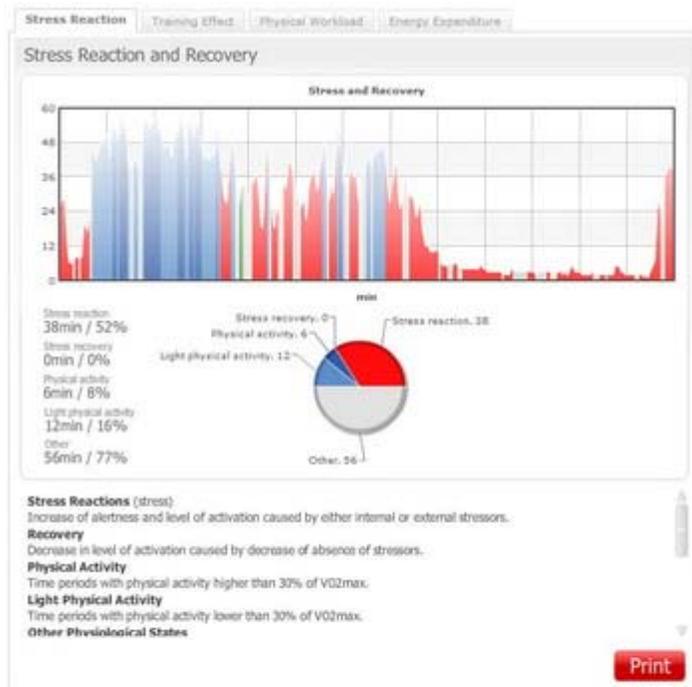
Qwave's Resources and Recovery Report offers the following features:

- Resources charts
- Recovery analysis (i.e. identify when the highest level of recovery occurred)
- Shares of stress and recovery in segments of equal length
- Balance of recovery (i.e. between stress and recovery)
- Resource follow-up

These Reports can be used for many applications, including:

- Monitoring the changes in resources in the course of the day

- Analysis of the influence of different work tasks on body's resources
- Monitoring long-term development of body's resource balance for planning and controlling changes in lifestyle



TRAINING EFFECT AND EPOC

All of us need at least some exercise now and then. Physical activity is crucial to the development and maintenance of our muscles and bone structure as well as for the efficient functioning of our respiratory and heart systems. In other words, even if you are just a regular person with a regular desk job, it is important to give your body sufficient physical activity.

With sports good fitness shape is a must. You must be healthy and toned in order to perform all your exercise at practice. It doesn't matter if you like to visit the gym, or the ballet or yoga classes, or just prefer to jog to stay you fit. Would you like to know the actual health effects on your body?

If you are professional athlete, you have got to give all you got too keep up with competition. Not only must you stay away from injuries; you must stay healthy and fit.

Qwave tells the effects training exercises have on your body

Qwave can straightforwardly verify the health effects of everyday physical activity. You can check how your everyday physical activities affect your health. Measurements are taken during exercise and after data is analyzed reports are prepared.

Qwave can also help you plan focused exercise sessions, and set and reach training goals. A whole day can be analyzed, and so can single workouts.

Qwave is suitable for beginners as well as professional athletes. The analysis shows the accumulation of training load and its true improving effect on physical condition. Having the opportunity to view the progress physical condition makes is good motivation for inactive persons to exercise.

Advantages of physical activity monitoring with Qwave:

- Recognition of the effects of everyday activities on health
- Oxygen consumption (VO₂) based on the heartbeat
- EPOC (Excess Post-exercise Oxygen Consumption) and training effect
- Results are analyzed and presented in simple reports:
- Health Promoting Physical Activity
- Training Effect Report

Health Promoting Physical Activity Report

This report shows the health promoting effects of physical activity during measurement periods and after data is analyzed, provides advice for improvement, where necessary.

This report is perfect for everybody who is interested in sports and wants to see the positive effects of sports on health and fitness. Understanding the report does not require any expert knowledge and it is suitable for those who care about their health and physical fitness.

Health Promoting Physical Activity Report offers the following features:

- Health promoting physical activity chart

- Distribution of physical activity to different intensity levels
- Health analysis of the physical activity
- Health index
- Health benefits and risks
- Health index follow-up

There reports are useful for:

- Analysis of the health promoting effects of a single workout
- Comparison of different sports
- Comparison of different intensity levels and durations of workouts
- Monitoring of changes in long-term training programs planning
- Monitoring of the health promoting effects of everyday activities

Training Effect Report

The report shows the positive training effect of a workout on physical fitness and physical condition during the measurement period.

The effects of training are visible for longer periods of time. No one expects instant results. In many cases individual players from the same football, basketball or soccer team would be training under different conditions. For example, athletes that have recently recovered from injuries train under a lighter training regime compared to their colleagues without health issues.

In any case, different training programs or different parts of training programs may have different goals to achieve. But there is no such thing as a universal training program. When things get sophisticated, both coach and player want to get the best results possible. This is when Qwave helps.

This is the best tracking and monitoring system for the job yet! Qwave Training effect reports provide real information about what is the actual effect of the training program on the athlete's body. It's all about achieving the goals set and getting the best results possible.

This report is perfect for everybody in the field of sports who wishes to obtain exact info about the effects of exercise on cardio respiratory fitness. It is especially suitable for bodybuilders and athletes who go in for endurance sports, such as football players, soccer players, etc.

Training Effect Report offers the following features:

- EPOC and training effect chart
- Training effect analysis
- Endurance training classification (to different training types)
- Training follow-Up

Reports are useful for:

- Analysis and comparison of different sports
- Comparison of different intensity levels and durations of exercise
- Analysis of the training load
- Analysis of different training types during the workout
- Monitoring of long-term development to schedule an adequate number of hard and easy training sessions

Qwave helps you stay fit and healthier

Qwave helps you stay fit and healthier. And the latter is probably the most important aspect of life.

People who do not get enough exercise are more susceptible to diseases than others. This is because lack of exercise makes your immune system lethargic and your natural protection is not efficient enough against viruses and bacteria.

With athletic people illness might result from fatigue due to overtraining. But you often cannot afford to stay in bed for long and completely lose shape. And competing undertrained brings risks of injuries and humiliation.

Qwave is designed to really help avoid these situations. Its recognized methods are based on years of researches. Boost your health and shape. Let Qwave help you progress.

TRAINING EFFECT

See the effects of your workout

Physical workout is necessary to maintain or improve your fitness level. Exercises improve the aerobic performance of the body. Repeated exercises cause the body to respond by increasing its performance capacity. This physiological response is called training effect (TE).

Everyone knows fitness is achievable with regular exercise but, in most cases, it is better results that we want. Therefore, we just need the precise piece of information that can help us train effectively. Reaching optimal Training effect is relatively easy.

5 - Overreached

4 - Highly Improving

3 - Improving

2 - Maintaining

1 - Minor

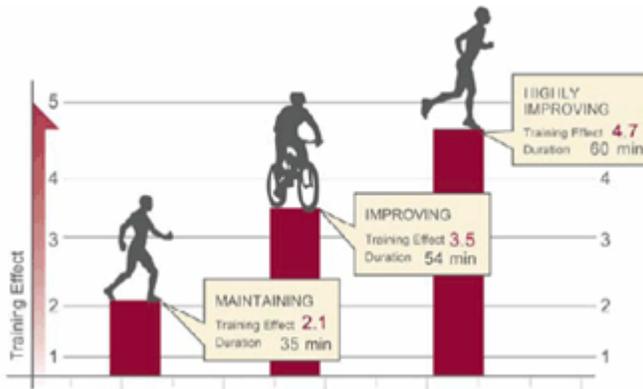
Observe the Training Effect of your workout – improve your fitness!

- Training effect measures the impact of exercise on aerobic fitness.
- Improve your fitness shape: observe the Training Effect of your workout.
- Training effect is scaled from 1.0 to 5.0.
- Training Effect is based on EPOC (read more on EPOC from EPOC White Paper). To get your EPOC, your heart beat must be recorded and analyzed. Training Effect is the simplified interpretation of the effect of EPOC gained in the exercise. Training Effect makes physical training easier to understand.

Knowing the true effect of your workout enables you to carry out aerobic training effectively and safely, and to improve your fitness shape.

Training Effect through different stages of workouts:

Training Effect is easy to interpret: Just one number tells you the effect of your training!



Get your Training Effect (TE) results in real time. You decide when to stop.

- Exercise at varying intensity during the workout – training effect gives you the progress of your workout.
- Training Effect is suitable for all aerobic sports; with all healthy individuals; using any equipment; and is comparable across time.
- Training Effect filters out all training load that really improves your fitness level.

Training effect makes your workout more efficient

Training Effect increases during the workout depending on intensity and length of your exercises. You can see for yourself how much it takes from each exercise that only maintains your fitness level or contributes to improving, or for even highly improving training effect. Training Effect also tells you if the workout is too hard for your current body state and shape.

HOW DOES TRAINING EFFECT WORK?

Real-time feedback of your workout effect

Increase your Training Effect during effective training. This is a gradual process that starts at the lowest value 1.0 with less physically active people. This information helps to understand, direct, and motivate yourself through your training session. During the workout progress information in real time is obtained about:

- Your current Training Effect
- Pace and scalability guidance: e.g. should the pace be faster or slower to achieve your goals

- The time required to reach the goals set; the time it takes to reach the next level of TE with the current pace.

TE with Qwave provides important and useful feedback – if you do not have a personal training instructor, train the trainer within you.

- Feedback provides information about your Training Effect as you progress in it.
- The pace instructions help you keep the pace to reach your target.

What do I need to get my TE?

It is so easy to use. Set it up to your personal profile: input some personal data, such as your gender, age, height, weight and date of birth. Determine your Activity class (values ranging from 0 to 10)

After setup is complete, you have access to the benefits of Training Effect Assessment and other relevant physiological information during your workout.

An example for Guided workout

Achieve your preset Training Effect goals with Guided workout and the recommended workout duration.

You may set a goal for your workout by one of the following ways:

- Using Training Coach (click here to learn more about Training Coach), that automatically recommends you a correctly dimensioned workout based on your training history or current Activity Class.
- Selecting one of the preset workouts stored in the program.
- Setting freely your own target as you like.

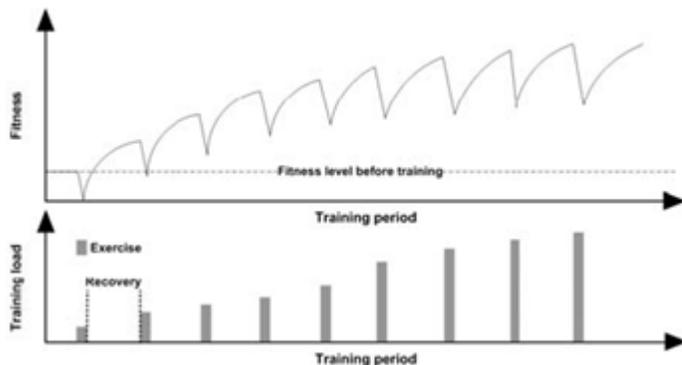
BACKGROUND OF AEROBIC TRAINING EFFECT

Training Effect indicates the effect of a single workout on cardiorespiratory fitness or fitness of the heart. Good cardiorespiratory fitness is related to the ability to perform moderate to high-intensity physical activity for prolonged periods. Basically, Training Effect is the value that indicates the efficiency of a workout performed and is expressed with one easy to understand value from 1.0 to 5.0.

In the past, the effect of a workout could only be observed by comparing fitness test results before and after a longer training period. In this sense, TE saves time and is a more precise method.

How can Training Effect be measured?

Each workout produces some kind of effect on the body, no matter if you practice sports or just visit the gym. In order to increase your fitness level, the exercises performed must bring a certain training load that is enough to disturb the homeostatic balance of the body. Please see the figures below.



EPOC (Excess post-exercise oxygen consumption) is a physiological indicator of training load (amount of disturbance of the homeostasis). EPOC accumulates when we do physical exercise.

Training Effect is the individual interpretation of EPOC. This means that a peak value of EPOC achieved in workout is individually interpreted to Training Effect on the basis of personal training history (activity class). For example, a professional athlete needs to reach higher EPOC than a beginner to achieve the same Training Effect. This also reflects the situation with people in good shape: they must do harder workouts to gain the same Training Effect.

In order to measure EPOC and Training Effect, only heart beat interval data needs to be collected during exercise

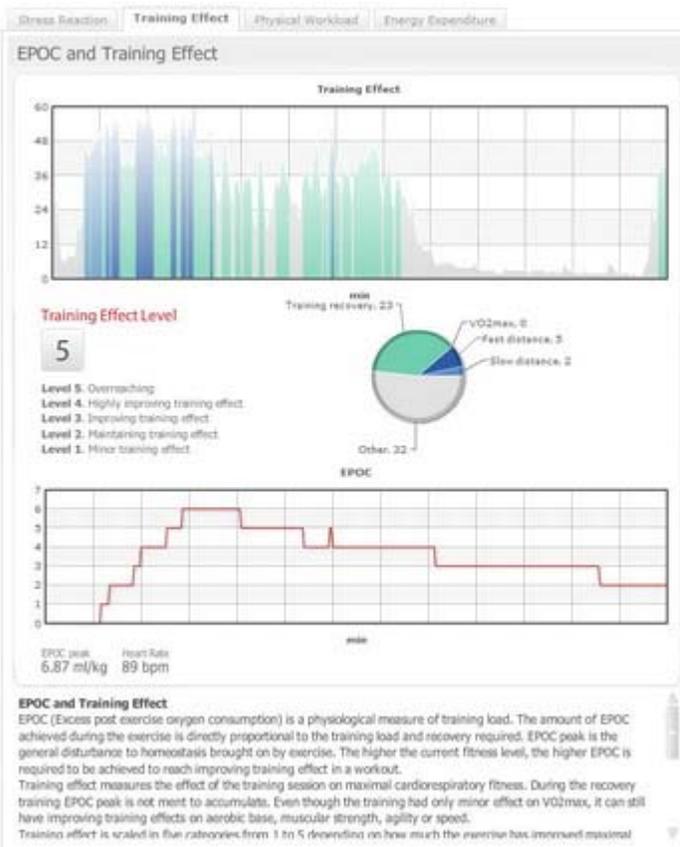
Summary

EPOC is the measure of the training load (measure of the disturbance of homeostasis). The peak value of EPOC that is achieved in an exercise is then scaled individually according to the Activity

Class (fitness level) of the person. This provides the personal information of the Training Effect of the exercise.

The table below describes the different levels (1.0-5.0) of Training Effect:

Training effect achieved		Physiological benefit and interpretation
5.0	Overreaching	Benefits: Very good effect on maximal cardiorespiratory fitness. Recommendation: Only for very fit individuals experienced in training. Should be performed only occasionally, must be followed with adequate recovery and light, regenerating recovery training.
4.0 – 4.9	Highly improving training effect	Benefits: Sharply improves cardiorespiratory fitness. Recommendation: For fit individuals 1 to 2 times a week. Workouts of TE 1 to 2 or rest are recommended to follow to balance the training and achieve recovery.
3.0 – 3.9	Improving training effect	Benefits: Improves cardiorespiratory fitness Recommended: For regular trainers 2 to 4 times a week but considering overall weekly training load.
2.0 – 2.9	Maintaining training effect*	Benefits: Builds a foundation for better cardio-respiratory fitness and harder training in the future, maintains cardiorespiratory fitness. Recommended: For all as a regular part of the training program as longer (~45-90 min) duration workouts.
1.0 – 1.9	Minor training effect* (Base building or recovery exercise)	Benefits: Good for health and wellness, enhances recovery after harder workouts. Recommended: For a beginner as base building easy workout to get used to training. For an athlete as a recovery workout and in longer duration (over 1h) to develop endurance base.



EPOC BASED ON HEART RATE

EPOC (excess post-exercise oxygen consumption) prediction based on heart rate (HR) measurement. EPOC is basically the excess oxygen consumed during recovery from exercise as compared to resting oxygen consumption. The EPOC prediction method has been developed to provide a physiology-based measure for training load assessment.

Training load assessment

There is no such thing as universal optimal exercise dose. It is different with different people. Sufficiently strenuous exercise causes a disturbance in body's homeostasis which after recovery results in improved fitness. Too easy training does not improve fitness but long-term hard training may lead to overtraining. This is a particularly unwanted effect with professional athletes. Overtraining may become apparent when it is too late, e.g. during tournaments, championships, etc. It is therefore important to measure the training load.

Methods that are used in assessing training load may be broadly defined as subjective and physiological measures. Subjective measures are easy to access, but do not always reflect physiological responses and recovery demand. Traditional physiological measures (like oxygen consumption (VO₂), heart rate and blood lactate) reflect mainly momentary intensity of exercise and not the length of exercise or the cumulative exercise load. There are other training load indicators (E.g. training impulse (TRIMP)), but most do not have physiological basis or scale and therefore may be difficult to interpret.

EPOC is a physiological measure (amount of oxygen consumed in excess after exercise as measured in liters or ml/kg) that reflects the recovery demand and the disturbance of body's homeostasis brought by the exercise. Measurement of EPOC is achieved by analyzing respiratory gases with specialized laboratory equipment, which makes it expensive, time consuming and not applicable to practical sports purposes.

This lack of valid and easy-to-apply physiology based method for the assessment of training load has led us to

This is when we developed a method to estimate EPOC indirectly from heart rate

measurement. This method is a valid and easily applicable physiology based method for the assessment of the training load of a physical exercise session.

EPOC in physical exercise sciences

The first observation of an elevated resting metabolic rate after exercise was made as early as 1910. The modern name EPOC has been used not only to represent oxygen repayment during recovery, but also to reflect the general exercise-induced disturbance of body's resting metabolism and homeostasis.

Basically EPOC reflects the body's requirement for recovery after physical exercise. Active oxygen-consuming recovery processes occurring in the body are due to replenishment of body's resources (O₂-stores, ATP, CP) and increased metabolic rate (increased HR and respiratory work, elevated body temperature) caused by metabolic by-products and hormones produced during exercise.

Some EPOC science facts

EPOC reflects the general disturbance in the human body's homeostasis caused by physical exercise.

EPOC is calculated by subtracting the area under resting VO₂ from the area under the recovery VO₂ curve.

EPOC gets higher with higher intensity and/or longer duration of exercise.

Construction of the Model for Heart Rate Based EPOC Prediction

The EPOC model was constructed based on meta-analysis data of peer-reviewed articles. Only valid studies were carefully selected for this purpose. The data included 48 different exercise settings, including a total of 158 trained and untrained male and female subjects. Exercise durations ranged from 2 to 180 minutes and exercise intensities from 18 to 108% of VO₂max. The modeling data included both continuous and intermittent exercises and consisted of running, cycling and upper-body ergometer exercise.

EPOC is predicted only on the basis of heart rate derived information (see Figure 2). The variables used in the estimation are current intensity (%VO₂max) and duration of exercise (time between two sampling points, dt) and EPOC in the previous sampling point. The model is able

to predict the amount of EPOC at any given moment. No post-exercise measurement is needed. The model can be mathematically described as follows:

$$\text{EPOC}(t) = f(\text{EPOC}(t-1), \text{exercise_intensity}(t), dt).$$

At low exercise intensity (<30-40%VO₂max), EPOC does not accumulate significantly after the initial increase at the beginning of exercise. At higher exercise intensities (>50%VO₂max), EPOC accumulates continuously. The slope of accumulation gets steeper with increasing intensity.

EPOC AS A MEASURE

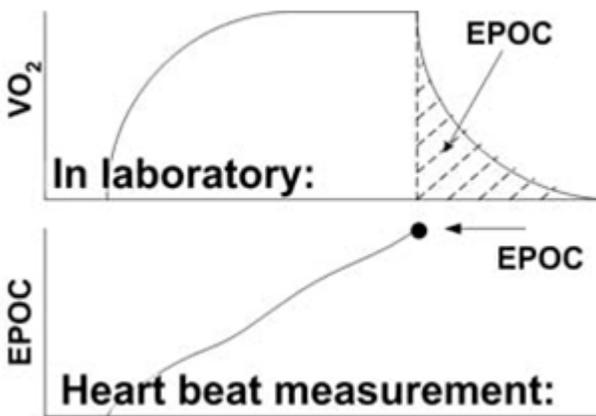
EPOC is a physiological measure for training load

Working out with a low overall training load does not improve fitness condition and shape. On the other hand, too much load may lead to overtraining over time. Therefore it is important to measure your training load.

EPOC is basically the excess oxygen consumed during recovery from exercise as compared to resting oxygen consumption. It is a physiological measure of training load. The amount of EPOC achieved during each exercise is proportional to the training load and recovery required.

EPOC is perfect for training:

- The more you exercise in terms of intensity and duration, the higher is the build-up of EPOC
- Virtually applicable to any exercise at all. Intensity level may vary during the training session; breaks are allowed and everything will be taken into account.
- EPOC indicates the effects of the entire training session.
- Current physiological state is directly reflected in EPOC accumulation: if one is not recovered from the previous exercise – this will result in higher EPOC.



Traditionally, EPOC is measured only after the exercise as the excess oxygen consumption during the period of recovery. See figure above. To make an accurate measurement, you need expensive equipment for breathing gas analysis under controlled laboratory environment. Now EPOC can be accurately and reliably pre-predicted based on just the measurement of heart beat data during exercise, and not requiring any monitoring at all of the recovery period. Experiments have shown correlation of 0.89 between measured and pre-predicted EPOC. Read more about validity from our EPOC white paper.

EPOC has several advantages as a measure of training load:

- An objective, physiology-based and scaled measurement method
- Scientifically validated method, based on laboratory studies
- Scientifically acknowledged to be better than lactate
- The heart beat data collection and analysis based on method is non-invasive, and is designed for your comfort and safety

ENERGY EXPENDITURE AND WEIGHT MANAGEMENT

The weight-watching bug is something that gets to you sooner or later. A lot of people have problems with their weight. Typically, overweight is considered the more widespread problem, as it may affect the overall well-being of a person and cause many illnesses. This is when Weight Management comes as a logical preventive to gaining too much weight. Effective weight management is exclusively based on the balance of energy intake and energy consumption.

Qwave provides an exact estimation of the total daily energy consumption. This facilitates goal-orientated weight management that reflects the proper ratio of energy intake and energy expenditure. Moreover, the effect of exercising on total burning of energy is explored, as well as the distribution of energy sources. Results about Energy Expenditure and Weight Management are presented in separate reports: Energy Expenditure Report and Weight Management Report.

Benefits of Qwave Energy Expenditure monitoring

- Indication of the effects of everyday activities on energy consumption
- Very exact energy consumption (EE) based on the heartbeat rate
- Comprehensive reports:
 - Energy Expenditure Report
 - Weight Management Report

Energy Expenditure Report

The report provides an analysis of the amount of energy expenditure measured during active physical activity exercise, as well as its distribution depending on the different levels of intensity. It also includes a comparison of physical activity during the measurement with other activities that consume the same amount of energy and an estimation of the 24h energy expenditure.

The reports are suitable for everyone who cares about a healthy way of life and wants to know the exact energy expenditure of his / her body or maybe compare energy intake and energy consumption.

The Energy Expenditure Report offers the following features:

- Energy expenditure chart
- Energy expenditure comparison
- Energy expenditure and health effects
- 24h energy expenditure prediction
- Energy expenditure follow-up

There reports are useful for:

- Comparison of the energy expenditure of different workouts

- Assessment of the daily energy expenditure
- Assessment of the distribution of energy expenditure during the measurement
- Assessment of the distribution of physical activity to different intensity levels

Weight Management Report

This report represents information about the proportions of fat and carbohydrates suitable for you. It specifies the heart rates at which fat expenditure and total energy expenditure reach highest levels. According to the data analyzed, four different diets and the weight changes caused by them are assessed.

The report is suitable for everybody interested in weight management in accordance with energy intake and consumption.

Weight Management Report offers the following features:

- Distribution of energy sources
- Maximal energy expenditure (kcal/min)
- Optimizing fat expenditure
- Energy balance
- Weight change prediction
- Energy balance follow-up

There reports are useful for:

- Comparison of the energy expenditure of different workouts
- Assessment of the daily energy expenditure
- Choosing the most suitable diet
- Determining the optimal training intensity to achieve the appropriate utilization of fat and carbohydrates
- Monitoring of the long-term development of energy balance

ENERGY EXPENDITURE ESTIMATION BASED ON HEART RATE MEASUREMENT

Energy Expenditure Estimation based on the Heart Rate

- The described energy expenditure (EE) estimation method is based on a scientifically recognized relationship between the cardiorespiratory function and the energy expenditure

measured.

- The heart beat based EE-estimation method is definitely more accurate than traditional heart rate level based estimation.
- This accuracy is due to the method's capability to utilize information on respiration rate and on/off-kinetics of oxygen consumption, as well as information on body's metabolism.
- This method is easy to use. No special calibration of individual heart rate levels is required and only the only information needed is the heart beat data and some personal background parameters (e.g. age, height, weight, gender and physical activity level).
- The method can be used in any state of the body, from rest to maximal exertion physical activities. It even allows detailed measurements during dynamically changing conditions, e.g. combined exercises and in-between rests.
- This EE-estimation method can be used as a non-invasive measurement tool for both personal and professional purposes, including weight management, promotion of physical activity and lifestyle assessments, and fitness training.
- The method is also applicable for research purposes to extend EE measurement from laboratory to the field.

Health and Weight Management

Dynamics of modern life bring real challenge to people time and motivation for physical activity. During the last decades it was found that sedentary and inactive lifestyle may lead to serious health-related issues. One of the most popular problems of the kind is gaining overweight.

Nowadays there is no doubt that regular physical activity may have a tremendous positive effect on a person's health. The assessment of energy expenditure in real life has become increasingly important, since it may help to identify inactive lifestyles and to motivate towards more active lifestyle.

In most cases, Energy Expenditure is often associated with energy intake for weight management purposes. Not only does is energy expenditure key for a healthy lifestyle, but measuring it plays important role in defining the actual relationships between physical activity

and health.

Fitness and sports

Energy Expenditure is an important indicator in fitness and athletic training. Athletes and active sports participants, together with their instructors, coaches and personal trainers, can plan their nutrition by utilizing information on expended calories.

If you are into professional sports, then you are likely to be on a strict diet. With many sports, energy intake and Energy Expenditure must be well-controlled for the sake of top results. Bodybuilding is particularly dependent on these parameters with relation to appropriate physical exercising. In any case, measuring EE is an inseparable part of your body shape fitness program.

Qwave allows you to plan your nutrition and assess its actual effect on your body considering physical activity. So you may measure your EE during exercise and rest to have a virtual multidirectional view on the actual responses of your body to your diet and your exercise. Measuring EE allows you to straightforwardly define what proportions of carbs and / or fats you can consume and which exercises have the best effect on your performance. Combine nutrition and physical activity assessment with Qwave.

Science

EE can be measured with different methods, including direct and indirect calorimetry, the so-called water technique, activity diaries and questionnaires, as well as methods that utilize information on heart rate or motion. All methods have some advantages and certain limitations, so selecting the most optimal method depends on the purpose of use.

Heart rate (HR) is probably the most frequently used indirect parameter in EE-assessment, because: it is easy to measure; EE is easily accessible from HR data; HR-based EE-estimates are relatively accurate in steady exercise conditions.

Conventional HR level -based energy expenditure estimation methods also have some limitations, including some or all of the following: certain inconsistencies in HR-EE relationship interpretations (e.g. when exercise intensity changes dynamically); the most accurate HR-level based methods require individual laboratory calibration; most traditional methods are not accurate enough or assume a constant level of EE at low intensity of physical activity; non-metabolic increases in HR that influence the results are not taken into account (e.g. mental and

non-exercise related physical stress); metabolic changes in the body due to prolonged physical activity or recovery are not taken into account.

Qwave Technologies has developed an innovative approach to EE estimation based on heart rate information. This method is based on analysis of beat-by-beat heart rate data and is developed to illustrate an accurate EE assessment. One of the main goals of this method was to resolve the problems that cause fluctuation errors in traditional EE-estimates.

Energy Expenditure Estimation Method

The estimation of total energy expenditure is carried out in two stages: At first, oxygen consumption (VO₂) is estimated. The second stage includes an estimation of metabolic events in the body. The described energy expenditure estimation model has been constructed using neural network modeling.

VO₂ estimation

The energy expenditure estimation method described in this document is based on the VO₂ estimation method that is described in detail in the VO₂ White Paper. Shortly, in addition to utilizing HR information, the described VO₂ estimation method also utilizes information on respiration rate and on/off kinetics of VO₂ derived from R-R-intervals (time interval between two consecutive heart beats).

METs (Metabolic Equivalent), multiples of resting metabolic rate are commonly used to represent intensity of physical exercise. VO₂ –values is converted to METs by dividing VO₂ by a constant value of 3.5. One MET is therefore equal to a VO₂ of 3.5 ml/kg/min which is the amount of oxygen the body uses at rest. METs can be used in the described calculation model instead of VO₂.

Personal maximal heart rate (HR_{max}) and maximal oxygen consumption (VO_{2max}) or maximal METs (MET_{max}) are used in the calculation of momentary VO₂. HR_{max} and VO_{2max} (MET_{max}) can be estimated on the basis of personal background parameters, if the values have not been measured.

Energy expenditure by metabolic events in the body

In the described calculation model, energy expenditure is calculated on the basis of information on VO₂ (or METs), respiratory quotient (RQ) and caloric equivalent. RQ describes the ratio

between carbon dioxide produced and oxygen consumed in metabolism, varying from 0.70 to 1.00. RQ has a well-established deterministic relationship with caloric equivalent (=thermal equivalent), which describes the amount of energy expended per one liter of consumed oxygen, varying from 4.69 to 5.05 kcal/l O₂ (for the relationships between substrate use, RQ and caloric equivalent).

Both physical exercise intensity and duration are parameters that affect RQ and the caloric equivalent. An increase in exercise intensity results in increased RQ and caloric equivalent due to the increased oxidation of carbohydrates and decreased oxidation of fats. Prolonged exercise duration, on the other hand, has an opposite effect due to the increased oxidation of fat and decreased oxidation of carbohydrate.

When momentary VO₂ (or METs) and caloric equivalent are known, it is possible to calculate momentary energy expenditure. Total energy expenditure is calculated by summing up the momentary EE-values.

The described EE-estimation estimates only the aerobic component of energy expenditure, which may cause slight underestimation of EE during short-term anaerobic activities lasting from few seconds to a couple of minutes. However, the underestimation is insignificant in measurements lasting longer than 2-3 minutes.

PRACTICAL USE OF ENERGY EXPENDITURE ESTIMATION

The described EE-estimation that is based on beat-by-beat measurement of heart can be used in different applied settings and purposes. The method particularly enables a fairly accurate estimation of 24h energy expenditure.

Benefits of Qwave's Energy Expenditure estimation method

Qwave Energy Expenditure estimation method offers advantages for professional athletes and bodybuilders, as well as health-conscious people that just like to feel well in their bodies:

Sports and Fitness

- Comparison of 24 h energy expenditures profiles from different days
- Setting daily target calories for light physical activity or fitness training

- Observation of actual correlation between EE and physical exercise
- Motivation for a more sports-oriented lifestyle by instant observing of results
- Athletic nutrition planning

Health and Weight management

- Efficient weight management with information on daily energy balance
- Long term weight change prediction based on daily measurements
- Confirming health effects of daily physical activity
- Selection of physical activities that are effective in burning calories
- Extending the use of less sensitive screening methods to more detailed energy expenditure assessments.

Weight management and health monitoring

Are you tired of having a diet that is said to really work but has no effect on your body? Are you working hard to lose those extra kilos and just cannot find the right proportions of proper diets and physical activity that let you achieve real results?

Overweight is a manageable problem now. Thank to Qwave's innovative method daily energy expenditure can be accurately evaluated using your heart beat. The method was specifically developed to assist in weight management programs, and is especially targeted at with losing weight. It includes information of nutrient consumption (Energy intake) and heart beat to define the accurate Energy Expenditure. Of course, information on the amount of calories consumed is essential in planning an optimal diet. In addition, exercise may be prescribed to contribute to the weight management program. Qwave's method is comfortable and accurate enough to be used to for long-term weight management.

Not everyone has time and motivation to dedicate extra efforts to physical exercises and extreme diets. Energy expenditure and activity levels can be also evaluated while you live your life normally. Health care professionals can have access to observing full-day activity profiles during everyday life. This is important for defining the positive and negative aspects of the user's daily life.

Qwave's method also allows health care professionals to prescribe an optimal amount of exercise to achieve the goals set. Personal feedback may additionally help to increase positive behavior models and decrease negative behavior models.

Fitness and sports

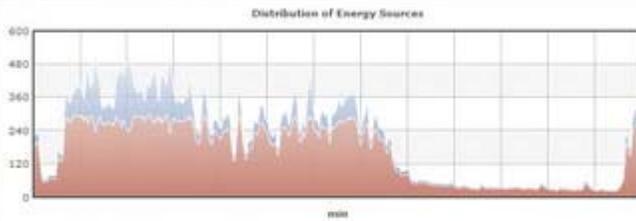
Energy expenditure assessments are very important for evaluating the effects of a chosen physical exercise or series of exercises. This makes it extremely helpful in professional athletic and fitness training. For example, in a bodybuilding training session it is often typical to compare energy expenditure values between different exercises. Having a detailed overview on the effectiveness of your exercises allows preparation of very precise personalized fitness programs in terms of proper physical activities and daily diet, depending on the goals set (e.g. losing fats, gaining muscle mass, etc.)

Qwave allows the instructor (coach) together with the athlete to design the athlete's daily diet considering the total energy expended in daily training and living. There is an important balance between healthy nutrition consumption and a positive-effect training sessions.

This is important since a proper nutritional state supports optimal recovery. But the nutrients to consume must be just enough for proper recovery of the body and not too much so that no unwanted weight is gained. This may be particularly critical for martial sports and other sports with category differences (e.g. boxing, kickboxing, wrestling, weightlifting, etc.).

In addition, this method allows the correct determination of body weight and composition by utilizing the information on daily energy expenditure. Optimize your fitness and physical shape and take advantage of modern technologies to be able to compete with all other contestants.

Energy Expenditure and Weight Management



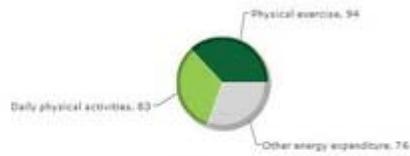
Average energy expenditure: 209 kcal/h
 Total energy expenditure: 253 kcal / 1062 kJ

Energy Expenditure Level

5

- Level 5** (> 500 kcal) during the exercise was demanding.
- Level 4** (280-500 kcal) through the exercise achieved the weight management recommendation.
- Level 3** (140-280 kcal) through the exercise achieved the health recommendation.
- Level 2** (70-140 kcal) You achieved half of the health recommendation of the daily energy expenditure through exercise.
- Level 1** (0-70 kcal) You stayed below the recommended energy expenditure recommendation.

Physical exercise
 94kcal / 394kJ / 37%
 Daily physical activities
 83kcal / 348kJ / 32%
 Other energy expenditure
 76kcal / 319kJ / 30%



Consumed Fats
 206kcal / 864kJ / 81%
 Consumed Carbohydrates
 34kcal / 146kJ / 13%



Other Energy Expenditure

Basal energy expenditure and low physical activity which doesn't have significant increasing effect on energy expenditure. (Intensity 0-20%V02max)

Not to Mislead Activities