Biological Age & Performance Analysis

Performance

nikos gazetas

Test Type:
Exercise Ramp

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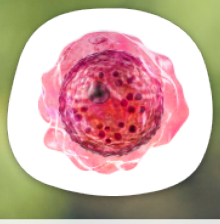
Pillars of Performance

Mental health

Mental health is a fundamental pillar of longevity since a healthy mind is a prerequisite for healthy choices and a healthy lifestyle. A well-functioning brain is tightly linked to effective breathing since our breath drives our brain's chemistry balance. On the contrary, poor breathing is linked to anxiety and lower cognitive capacity."

Heart health

A healthy heart is critical for overall health since cardiovascular disease (i.e., hypertension, coronary artery disease, and heart failure) is the second most likely cause of death and one of the most common threats to the quality of life. A healthy heart is effective in pumping oxygen-rich blood into your body.

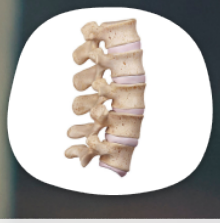


Cellular health

Cellular health is a fundamental driver of longevity as it provides the most potent shield against metabolic disorders such as Type II Diabetes and obesity. Healthy cells absorb oxygen efficiently, a prerequisite for burning fat and maintaining a high metabolism.

Lung health

High lung fitness is critical for a long and healthy life as lung disease (i.e., COPD, asthma, infectious disease) has become the most common cause of death. Healthy lungs are effective in transferring oxygen from their surface into the bloodstream.



Posture

Lower back pain and musculoskeletal problems are the number one driver of lower quality of life since they are a source of chronic pain and physical inactivity. Good posture is inextricably related to our breath since the way we inhale is the most potent regulator of our core's stability.

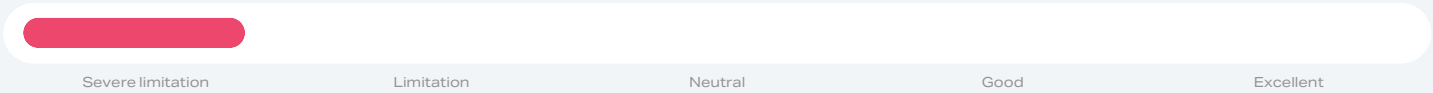
Gut health

A healthy gut is key to athletic performance since our gut microbiome can positively or negatively affect mood, digestion, and metabolism. Adequate oxygen flow throughout the entire oxygen chain (i.e., heart, lungs, cells) can mitigate the impact of an unhealthy gut.

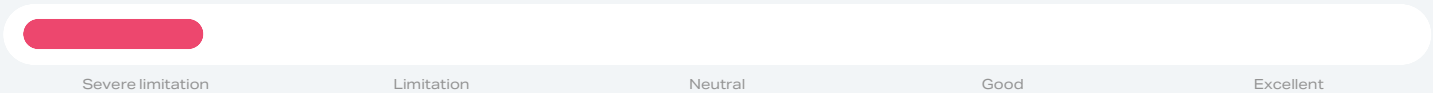
Overview

3	1	1	4	2	1
Severe limitation	Limitation	Neutral	Good	Excellent	Core Limitations

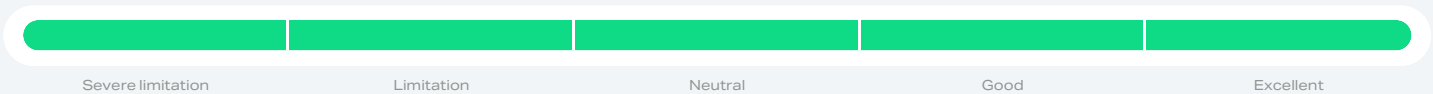
Aerobic Health - 16% | Severe limitation



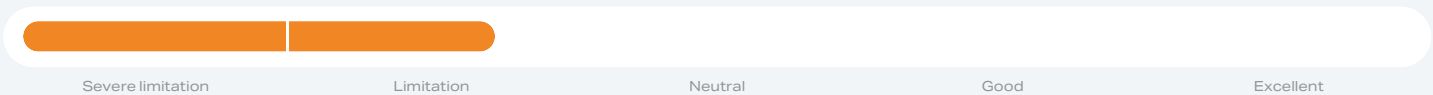
Cardiovascular Fitness - 13% | Severe limitation



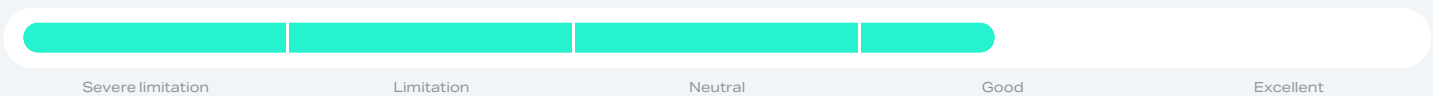
High Intensity Performance - 100% | Excellent



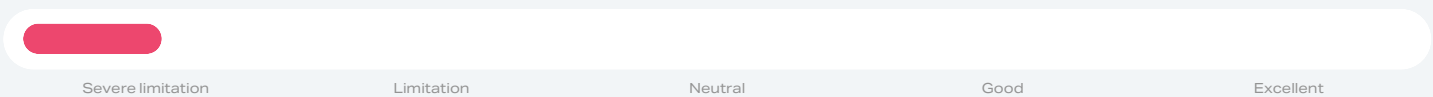
Recovery Capacity - 34% | Limitation



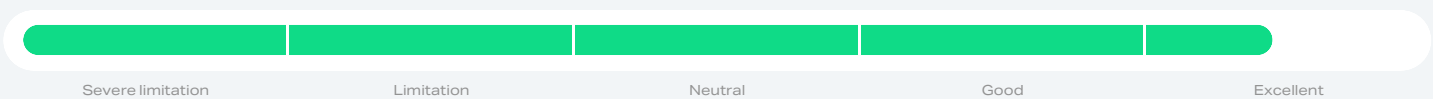
Fat Burning Efficiency - 70% | Good



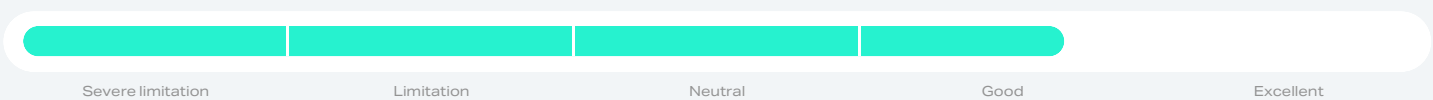
Movement Economy - 10% | Severe limitation



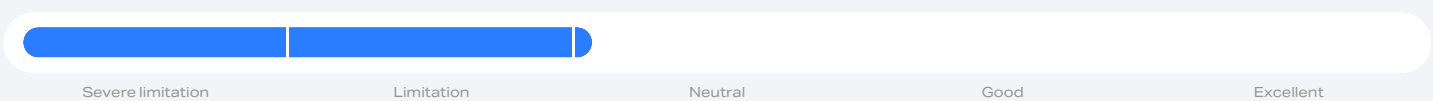
Metabolic Rate - 90% | Excellent



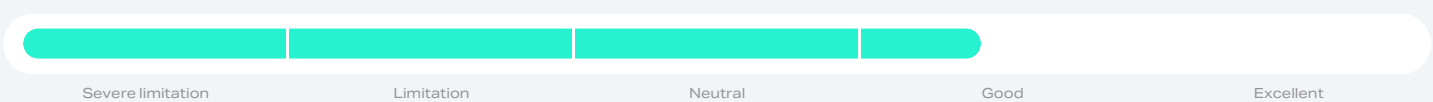
Expiratory Power - 75% | Good



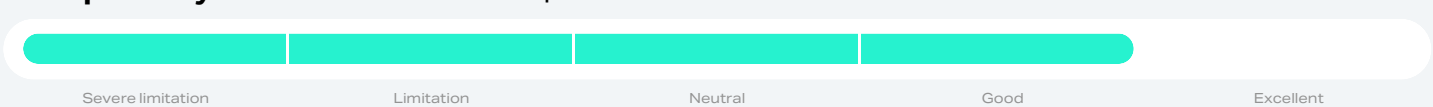
Breathing & Cognition - 41% | Neutral



Breathing & Stability - 69% | Good



Respiratory Coordination - 80% | Excellent



Core Metrics

The following metrics are the most important for performance. Achieving a high score maximizes the likelihood of high athletic performance.

Fat-Burning Efficiency 70% | Good

Why it matters

The most reliable indicator of recovery capacity and fuel efficiency.

How to improve it

Zone 2 endurance training and intermittent fasting are the main tools for improving oxygen absorption by cells which equates to high fat-burning ability, recovery and fuel efficiency.

Movement Economy 10% | Excellent

Why it matters

The second best indicator of performance in endurance events.

How to improve it

Zone 2 training, coordination training, and technic enhancement are the ways to improve the movement economy.

Oxygen Score 36% | Limitation

Why it matters

The gold standard predictor for any type of athletic performance.

How to improve it

All three core systems (i.e., cells, heart, lungs) play a role in oxygen transport. Improving this score thus means fixing the deficient system(s) with each one requiring an individualized process.

Wellness & Health History

Medical History

Henry Phillips is a 56-year-old male with a three-year history of type 2 diabetes and hypertension. He is prescribed Glucophage (metformin), and his diabetes is well-controlled. He is also prescribed Lasix (Furosemide) and currently has normal blood pressure readings. He is a long-term smoker and has also put on 10 kg over the last year, which is why he has suffered sleep apnea over the past six months.

Training History

He used to play tennis and go for long rides until two years ago when he gave up everything due to an injury in his left knee. He never went into surgery because it was attributed to arthritis. Although he has no acute pain at the moment, he is still scared to take up any kind of physical activity. Furthermore, his job is deskbound, and he transports by car.

Nutrition History

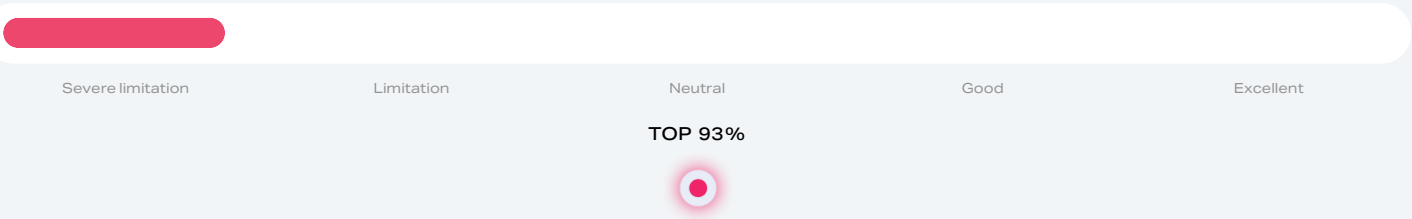
His current weight is 94kg, and he is 180cm tall. Over the last year, he has put on around 10kg due to the COVID pandemic, which forced him to work from home. This is the maximum weight he has ever reached since the last time he had put on weight five years ago had gone up to 90kg. He lost the extra weight by himself, managing his portions a little bit better and doing more exercise during the week. The minimum weight of his adult life was 81kg, and that's his current weight goal.

Biological Age

PNOĒ estimates your biological age based on your VO2 max, fat-burning efficiency, and metabolic rate. According to the American Heart Association, your cardio-respiratory fitness (VO2 max), is the best predictor of how long and well you will live. High fat-burning efficiency is equivalent to high cellular fitness, essential for preventing metabolic disease and weight gain. Lastly, a high metabolic rate is crucial for long-term health as it is the most effective shield against weight gain, the number one driver behind the three most common causes of death, lung, heart, and metabolic disease.

This green dot shows your measured VO2 peak. The dotted lines depict the different categories of your Aerobic Health score, i.e. whether your score is excellent or very poor based on your VO2 peak.

Aerobic Health - 16% | Severe limitation



What it is

Aerobic health is the best predictor of overall health since a high oxygen absorption or VO2peak requires effective operation of all critical organs, namely lungs, heart, cells, and blood. Therefore Aerobic Health provides the most holistic picture of every system essential to a long life and athletic performance.

How it is measured

Aerobic Health is calculated based on your measured VO2peak, i.e., the maximum amount of oxygen your body can absorb. The higher the VO2peak is, the higher the Aerobic Health score.

Recommendations to improve it

EXERCISE

Resistance

Increase in muscle mass leads to greater oxygen uptake as muscles have high oxygen requirements.

Endurance

Improves your cells' ability to absorb oxygen, resulting in whole-body oxygen uptake.

Interval

Improves heart function (more oxygen-rich blood pumped), lung function (more oxygen absorption), and thus overall oxygen uptake.

NUTRITION

Beetroots

Consuming beetroots rich in nitrates can boost oxygen levels during exercise and thus increase your VO2max.

LIFESTYLE

Exercise timing

Completing endurance or interval training in the afternoon positively affects your VO2max.

Sleep

Getting enough (7-8 hours) and good quality sleep will keep you well-rested and positively impact your VO2max.

Weight loss

Overweight and obesity will negatively impact your VO2max, and losing a mere 5% of your current weight, can help improve your VO2max

Why it's important for your goal

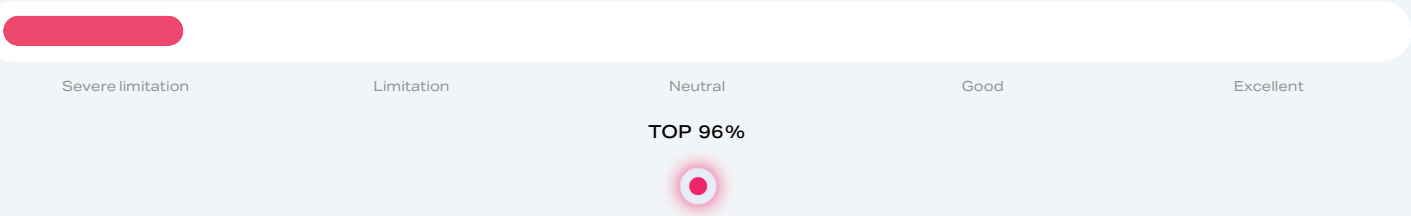
Oxygen is the molecule of life. It's a critical element for your metabolism, namely the process by which your cells "burn" nutrients (e.g., fats, carbs, proteins) to release their energy and keep you alive and moving. Your heart, lungs, and muscle all participate in this process. Whenever any of them suffers, your Aerobic Health will be immediately reduced. That's why The American Heart Association has recognized it as the most holistic gauge of your overall health. It's also no surprise that every significant chronic condition (i.e., cardiovascular disease), COPD, and metabolic syndrome is related to these systems and is manifested when their ability to uptake or utilize oxygen is reduced.

Scan to learn more

Scientific sources

- Strasser B. et al., VO2max predictor of longevity, 1505-1516
- Milanović Z. et al., Training for VO2max improvements, 1469-1481
- Lee J. et al., Determinants of VO2max and evaluation methods, 259-271
- Ross R. et al., Assessing Cardiorespiratory Fitness in clinical practice, 653-699

Cardiovascular Fitness - 13% | Severe limitation



What it is

Cardiovascular fitness is a gauge of your cardiovascular system's ability to pump oxygen-rich blood to your body.

How it is measured

It's calculated based on your O2 pulse, namely the VO2/HR, at two separate time windows; a 3-min window starting 1 minute after the ramp start and a 3-min window starting 3 minutes before the anaerobic threshold (VT2). It's also dependent on VO2peak, meaning that the cardiovascular fitness score, based on the calculation above, is normalized based on the measured VO2peak.

Recommendations to improve it

EXERCISE

Resistance

It can have a modest effect on improving cardiovascular fitness when it includes a high number of repetitions and results in a moderately elevated heart rate. Overall, it's not your go-to for improving this metric.

Interval

It's the most impactful modality for improving cardiovascular fitness, given its ability to enhance heart stroke volume and heart strength. High-intensity intervals (i.e., Zone 4) are also the most effective modality for improving VO2 max, a key driver of cardiovascular fitness.

Endurance

Although not as effective as interval training, endurance training can also increase stroke volume and thus improve cardiovascular fitness. Its efficacy is linearly related to the exercise intensity (i.e., Zone 2 - 4).

NUTRITION

Fruits

Consuming various fruits, more specifically bananas, melons, and berries rich in fiber and potassium, can improve cardiovascular fitness.

Vegetables

Consuming a variety of dark leafy vegetables, especially kale, mustard greens, and swiss chard, rich in fiber and vitamin K, can enhance cardiovascular fitness.

Seeds

Adding seeds, such as flaxseeds, pumpkin seeds, and sunflower seeds, to your diet, rich in vital minerals such as magnesium, can boost your cardiovascular fitness.

LIFESTYLE

Sauna

Sauna bathing can decrease blood pressure and improve overall cardiovascular function more efficiently when combined with exercise than exercise alone.

Meditation

Long-term meditation can significantly lower diastolic blood pressure and heart rate, increasing your cardiovascular fitness

Why it's important for your goal

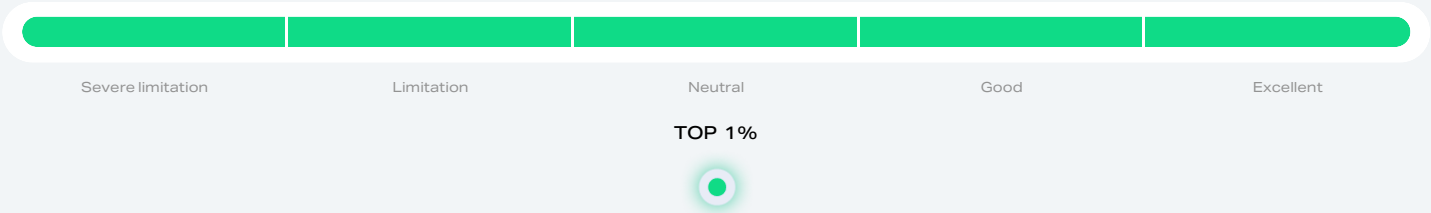
Cardiovascular fitness is very important for your wellness because cardiovascular disease is the number one cause of death and includes several life-threatening conditions such as ischemic heart disease (Coronary Artery Disease), heart failure, and valvular disease. A low VO2peak score combined with a flattening or decline in O2pulse is considered a reliable risk factor for them, one that can help you act early.

Scan to learn more

Scientific sources

- Forman D.E. et al., Cardiopulmonary Exercise Testing, 68-86
- Dyrstad S.M. et al., Cardiorespiratory Fitness in different exercise levels, 291-298
- Belardinelli R. et al., Exercise-induced myocardial ischemia, 1304-1313

High Intensity Performance - 100% | Excellent



What it is

It's a gauge of how well your lungs and heart perform at high exercise intensities.

How it is measured

High-intensity Performance is calculated by assessing how well the lungs supply oxygen and how well the heart pumps it into the body across all exercise intensities during a VO2max test. This is reflected by two metrics, namely, O2pulse, the oxygen pumped by heartbeat, and VO2 over BF, the oxygen absorbed per breath cycle

Recommendations to improve it

EXERCISE

Resistance

Since high-intensity performance relies on your respiratory and cardiovascular systems, resistance training will have little to no effect on it.

Interval

Zone 3 and 4 intervals are the most effective modalities for improving respiratory and cardiovascular performance during medium and higher training intensities and are thus the most effective tools for improving high-intensity performance.

Endurance

Similar to interval training, heavy endurance training (Zone 4) trains your lungs and heart to operate effectively during high-intensity training states.

NUTRITION

Iron-rich foods

Consuming foods rich in iron, such as red meat, red kidney beans, and dried apricots, is key to increasing oxygen supply throughout your body.

Beetroot

Beetroots are rich in nitrates which help dilate blood vessels, increasing oxygenated blood flow to working muscles, thereby increasing high-intensity performance.

Pomegranate

Pomegranates can improve blood flow by increasing nitric oxide (NO) bioavailability, enabling improved blood flow and oxygen delivery to the working muscles

LIFESTYLE

Breathing training

Adopting a regular breathing exercise routine, such as meditation or yoga-type breathing, can provide a significant boost to your O2 pulse, thereby increasing your high-intensity performance.

Hydration

Drinking enough water (2-3L/day) can help keep your lungs adequately hydrated and improve their ability to oxygenate your blood, which is a prerequisite for excellent high-intensity performance.

Spend time in the prone position

Lying down in the prone position improves ventilation in your lungs, thereby increasing the oxygen levels in your body and improving high-intensity performance

Why it's important for your goal

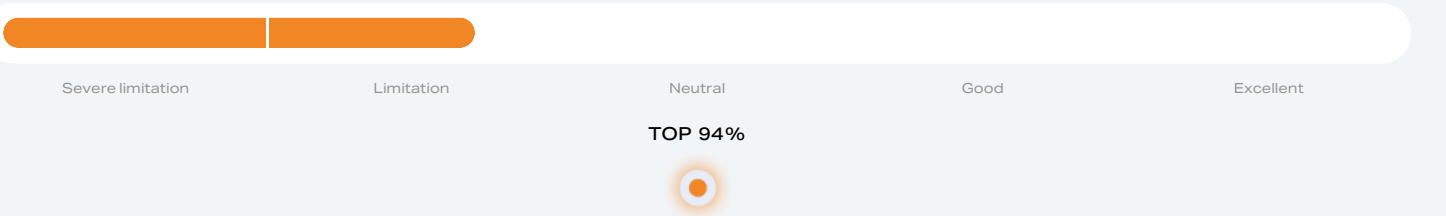
A high-intensity performance is important for your wellness and performance because having a high and continuously increasing O2 Pulse, and VO2/BF throughout high exercise intensities will ensure sufficient oxygen is delivered to your working muscles. This will, in turn, provide your body remains predominantly in the aerobic state when exercising at high intensities, thus allowing you to work out at intensities where you burn the most calories and prevent metabolic fatigue.

Scan to learn more

Scientific sources

- Pennington C., The exercise effect on the anaerobic threshold in graded exercise, 225-234
- Datta D. et al., Cardiopulmonary exercise testing to assess exertional dyspnea, 77-86
- O' Donnell D.E. et al., Exertional dyspnea in COPD, 333-347

Recovery Capacity - 34% | Limitation



What it is

It's a gauge of your ability to recover from physical exercise efficiently.

How it is measured

Recovery Capacity is measured by assessing the rate with which heart rate and volume of carbon dioxide exhaled, VCO2, drop during the recovery phase of the exercise test. The faster the heart rate and VCO2 drop during the first minute and the first two minutes of the recovery phase, the higher the Recovery Capacity.

Recommendations to improve it

EXERCISE

Resistance

Since recovery capacity is primarily influenced by mitochondrial density and fat-burning efficiency, resistance training has little to no effect on enhancing this metric.

Interval

High-intensity intervals (i.e. Zone 5) are the most effective ones in enhancing mitochondrial density, fat-burning efficiency, and thus recovery capacity.

Endurance

Since low-intensity endurance training (i.e., Zone 2) is the most effective modality for improving fat-burning efficiency, it is also the most potent tool for improving this metric.

NUTRITION

Lean protein

High-quality protein, such as fatty fish, eggs, lean red meat, and/or skinless chicken/turkey, can boost muscle recovery after a demanding training session.

Tart cherry juice

Tart cherry juice might facilitate muscle recovery and mitigate delayed-onset muscle soreness (DOMS).

Good-quality carbs

A good-quality carbohydrate source, such as quinoa, brown rice, or sweet potatoes, can help replenish muscle glycogen and thus accelerate whole-body recovery

LIFESTYLE

Hydration

Drinking enough water is essential so your body can effectively and quickly return to its normal state after an intensive workout.

Sleep

Getting enough (7-8 hours) and good quality sleep can help your body recover more efficiently.

Stretching

Devoting some time to stretch your muscles after a workout can accelerate recovery and teach your body to calm down more efficiently after intensive training

Why it's important for your goal

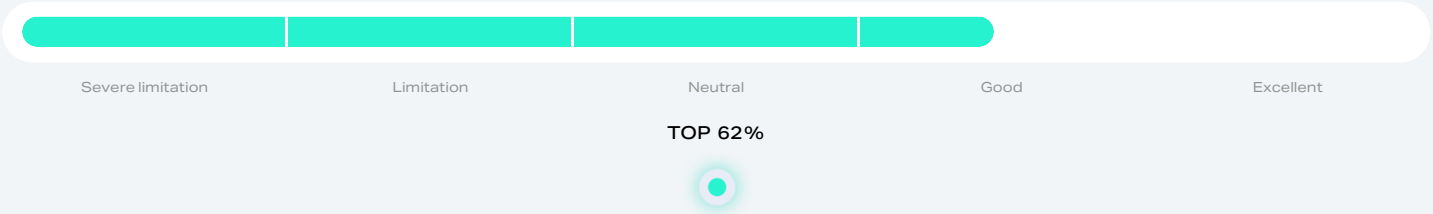
High Recovery Capacity is essential for any type of workout, especially for interval training (e.g., spinning), where there is a continuous change between exercise bouts following recovery phases. The higher your Recovery Capacity, the greater your body's ability to recover, the longer and more efficiently you can exercise, and the more calories you burn.

Scan to learn more

Scientific sources

- Duarte C.V. et al., Exercise heart rate gradient : A novel index, 629-635
- Qiu S. et al., Heart rate recovery and risk of cardiovascular events, Article number : 6
- Takgayanaki Y. et al., Respiratory gas indices during recovery from maximal exercise, 598-606

Fat Burning Efficiency - 70% | Good



What it is

It's the gauge of your cells' ability to use fat as a fuel source during exercise. Your cells primarily "burn" fats and carbohydrates to release the energy they contain and power your body's movement. The higher your Fat-burning Efficiency, the more your cells will rely on fats as a fuel source. Fat-burning Efficiency is also one of the most vital indicators of cellular health

How it is measured

Fat-burning Efficiency is calculated based on the Crossover Point, the exercise intensity, in terms of VO2, where someone's body transitions from burning primarily fats to burning mainly carbs. The higher the exercise intensity at this transition occurs, the higher the Fat-burning Efficiency score.

Recommendations to improve it

NUTRITION

Fatty fish

Fatty fish, such as salmon, is rich in protein and omega-3 fatty acids, both of which can keep fat-burning efficiency at high levels.

Greek yogurt

Greek yogurt is rich in protein which can help you increase your muscle mass and, thus, your fat-burning efficiency.

Coffee

Caffeine has fat-burning efficiency properties, meaning drinking coffee before a workout can help you burn more fat.

LIFESTYLE

Increased protein intake

A protein-rich diet can regulate your appetite and increase muscle mass, improving your fat-burning efficiency.

Cold exposure

Cold exposure, specifically the shivering reaction during this process, can increase fat-burning efficiency.

Reduce stress

Implementing stress-relieving strategies, such as mindful breathing, can help regulate your stress hormone levels, boosting your metabolism and fat-burning efficiency.

Why it's important for your goal

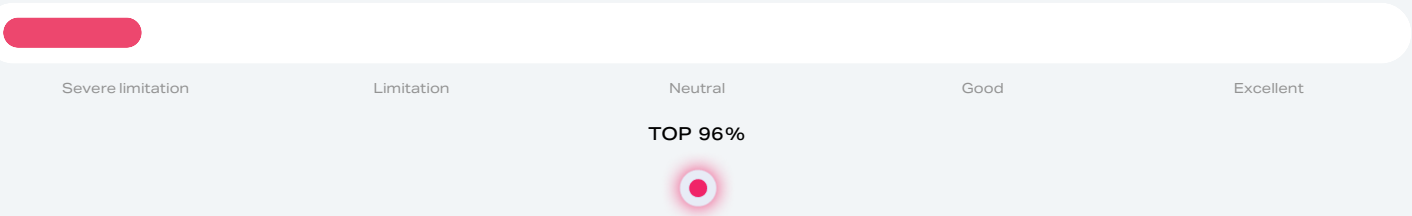
Good fat-burning efficiency is essential for your wellness because fat is a fuel source that requires oxygen to be utilized. The more oxygen your cells can uptake and utilize, the healthier they are, and the more they can rely on fat as a fuel source. That's why Fat-burning Efficiency is one of the most powerful indicators of cellular health, strongly correlated with longevity and health.

Scan to learn more

Scientific sources

- Randell R.K. et al., Maximal fat oxidation rates in an athletic population , 133-140
- Maunder E. et al., Maximal fat oxidation during exercise, Article number : 599
- Amaro-Gahete F.J. et al., Assessment of maximal fat oxidation during exercise, 910-921

Movement Economy - 10% | Severe limitation



What it is

It's a gauge of how many calories you burn during exercise. In other words, it demonstrates whether your body burns more or fewer calories than predicted based on your gender and age.

How it is measured

Movement Economy, also known as Mechanical Efficiency, is measured by assessing the rate you burn calories at different exercise intensity levels until the anaerobic threshold (AT).

Recommendations to improve it

EXERCISE

Resistance

Although strength endurance training can increase movement economy by training your neuromuscular system to activate fewer muscle fibers, strength and hypertrophy training will have the exact opposite effect.

Interval

HIIT assists movement economy by enhancing the muscle oxygen consumption efficiency

Endurance

Low-intensity endurance training (i.e., Zone 2) is the most effective modality for promoting movement economy. This is because it exposes the working muscle to a state of high energy demand and thus trains it to become as economical as possible.

LIFESTYLE

Proprioception

By developing your sense of self-movement, force, and body position during exercise, you can increase your movement economy.

Accessory work

Accessory work relevant to the muscles engaged during your main workout, such as long jumps or speed skaters for runners, can strengthen the supporting smaller muscles that are imbalanced or weaker than others, increasing your movement economy.

Why it's important for your goal

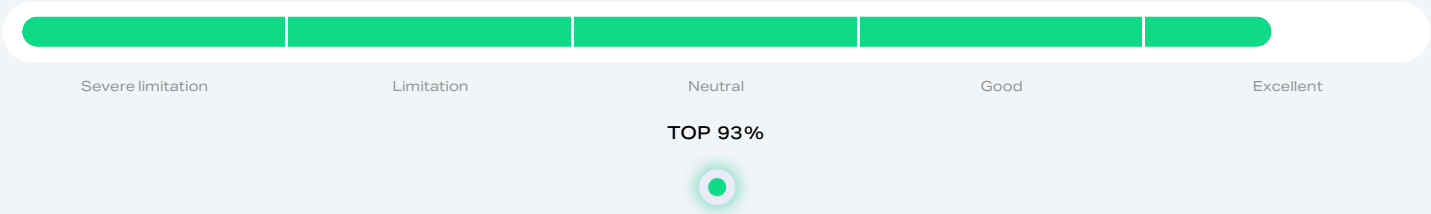
Movement Economy is essential for your wellness because staying lean or losing weight requires having a low Movement Economy at low exercise intensities (e.g., casual walking), or in other words having a low Mechanical Efficiency. In plain terms, you want your body to be uneconomical and burn many calories during your daily activities. Check your Metabolic Rate score for more information on how Mechanical Efficiency can impact your metabolism and your ability to lose weight.

Scan to learn more

Scientific sources

- Barnes K.R. et al., Running economy : measurement , and norms , Article number : 8
- Swinnen W. et al., Comparison of running and cycling economy, 1331-1338
- Shaharudin S. et al., Muscle synergies during incremental rowing VO2max test, 980-989

Metabolic Rate - 90% | Excellent



What it is

It's a gauge of how fast or slow your metabolism is. In other words, whether your body is burning more or fewer calories than what's predicted based on your weight, gender, age, and height.

How it is measured

Metabolic Rate is calculated by assessing the Resting Metabolic Rate, the rate with which your body burns calories at rest, and your Mechanical Efficiency during low exercise intensities, the rate with which you burn calories in the first stage of your exercise test (warm-up).

Recommendations to improve it

EXERCISE

Resistance

Strength and hypertrophy training is the most modalities for increasing your metabolic rate. This is because they promote muscle mass development and reduce your movement economy, making your body burn more calories while moving.

Interval

High-Intensity interval training (Zone 4 and 5) positively impacts your metabolism by promoting muscle development (in untrained subjects) and enhancing muscle development through the increase of growth hormone and testosterone levels.

Endurance

Endurance training has little to no effect on enhancing metabolic rate. Moreover, significant amounts of endurance training can even reduce metabolic rate due to its effect of increasing movement economy.

NUTRITION

Lean protein

A high-quality protein, such as fatty fish, eggs, lean red meat, and/or skinless chicken/turkey, can help you maintain and/or increase your muscle mass, hence your metabolic rate.

High-fiber foods

Eating high-fiber foods, such as fruits, vegetables, legumes, and nuts, can boost your metabolism by increasing diet-induced thermogenesis and decreasing body inflammation.

Coffee

Caffeine can increase your metabolic rate, meaning that sipping moderate amounts of coffee (2-3 cups per day) can increase your metabolism and improve your athletic performance.

LIFESTYLE

Increased protein intake

A protein-rich diet can increase your muscle mass, one of the most metabolically active tissues, increasing your metabolic rate.

Proprioception

By developing your sense of self-movement, force, and body position during resistance training, you can more efficiently increase your muscle mass and thereby increase your metabolic rate.

Standing office work

Long periods of sitting due to desk jobs burn fewer calories compared to standing office work, which can increase your metabolic rate during the day

Why it's important for your goal

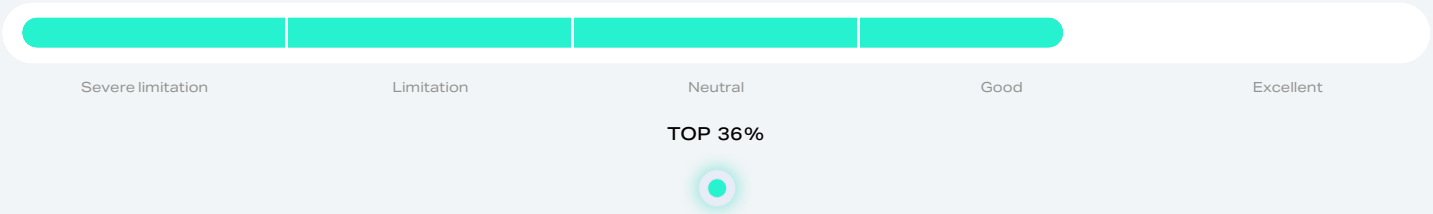
A high Metabolic Rate will protect you from weight gain as your body will burn more calories, thus allowing you to eat more without gaining weight. It also facilitates weight loss, as burning more calories means that even a modest restriction in food intake will result in significant weight loss. A high Metabolic Rate is attained through a high Resting Metabolic Rate and a low Mechanical Efficiency at low exercise intensities.

Scan to learn more

Scientific sources

- Amaro-Gahete F.J. et al., Metabolic rate in sedentary adults: The FIT-AGEING trial, 3230-3240
- Rosenbaum M. et al., Experimental weight perturbation on muscle work efficiency, 183-192
- Hargreaves M. et al., Skeletal muscle energy metabolism during exercise, 817-828

Expiratory Power - 75% | Good



What it is

It's a gauge of whether your lungs have the strength to contract fully during exhalation.

How it is measured

This is determined by examining the amount of air your lungs exhale during exercise. If this is significantly and persistently lower than 60% of the predicted maximum amount of air you can breathe out, you are likely facing an expiratory power limitation.

Recommendations to improve it

EXERCISE

Resistance

Specific types of resistance exercise can strengthen the respiratory muscles, including the diaphragm and muscles between the ribs that take part in exhalation.

Interval

The stress induced on the lungs during high-intensity exercise may promote expiratory power by strengthening the respiratory muscles. Zone 4 intervals are the most effective ones for improving this metric.

Endurance

In general, endurance training isn't expected to significantly impact this metric since a high exercise intensity level is required. Only heave steady state training (i.e., Zone 4) can be expected to induce a significant positive effect.

NUTRITION

Apples

Apples are rich in antioxidants, including flavonoids which can reduce the inflammation in the respiratory muscles and globally improve lung function.

Peppers

Peppers are among the richest sources of vitamin C, an antioxidant nutrient that can reduce the respiratory muscles' inflammation and improve lung function.

Tomatoes

Tomatoes are the richest dietary sources of lycopene, an antioxidant that has been shown to reduce airway inflammation.

LIFESTYLE

Smoking cessation

Smoking can cause a rapid decline in respiratory muscle strength, decreasing expiratory power.

Weight loss

Obesity can lead to decreased expiratory power through increased inflammation in the respiratory muscles.

Active breathwork

The effort of actively guiding your breath to gradually increase your breathing rate by following PNOE's breathing exercises focused on expiratory training can strengthen lung muscles and increase expiratory pressure.

Why it's important for your goal

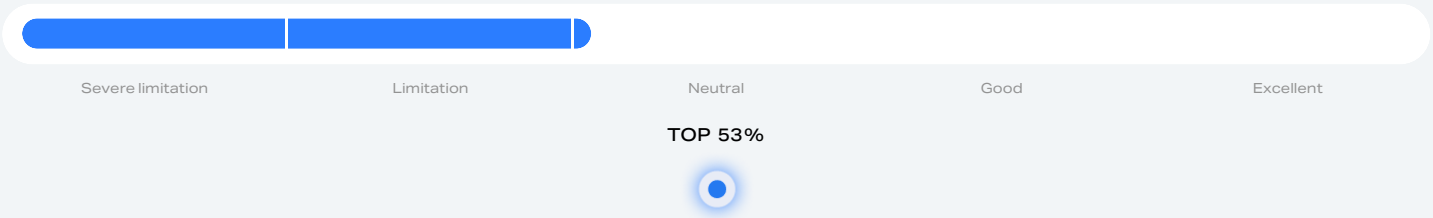
Having lung muscles that are strong enough to empty your lungs during exhalation effectively is essential for ensuring proper breathing function. Pushing enough air out during exhalation is necessary for clearing carbon dioxide effectively. When exhalation isn't strong enough, carbon dioxide may start to build up, leading to feelings of fatigue, dizziness, and even chronic disease such as COPD. This is why good expiratory power is vital for your wellness.

Scan to learn more

Scientific sources

- Smith J.R. et al., Expiratory flow limitation during exercise, 26-31
- Weavil J.C. et al., Endurance exercise performance in acute hypoxia, 1653-1663
- Theodorakopoulou E.P. et al., Effect of pulmonary rehabilitation in COPD patients, 47-54

Breathing & Cognition - 41% | Neutral



What it is

It's a gauge of how your breathing affects your cognitive function during exercise.

How it is measured

The Breathing and Cognition score is calculated by assessing your breathing frequency in exercise intensities before or during training zone 1 if a subject enters their training zone 1 right from the warm-up. It's a gauge of how your breathing affects your brain function and ability to think. The expected breathing frequency for exercise intensities below training zone 1 is between 15 to 25 breaths per minute and for exercise intensities in training zone 1 for training zone 2 is between 18 to 30 breaths per minute.

Recommendations to improve it

EXERCISE

Resistance

Strength training induces benefits to cognitive performance, which derive from preventing degeneration in specific regions of the brain such as the hippocampus, a complex that plays a major role in learning and memory https

Interval

It has been demonstrated to produce benefits in cognitive capacity stemming from enhanced neuroplasticity (the ability of neurons to evolve) and the activation of certain brain regions by lactate produced from the working muscles. (https

Endurance

According to CDC, moderate exercise (i.e., Zone 2) promotes memory and cognition thanks to the secretion of growth factors, chemicals that support the growth of new blood vessels and cells in the brain.

NUTRITION

Swiss chard

Swiss chard is a leafy green vegetable packed with stress-fighting nutrients, such as magnesium.

Matcha

Matcha is a type of green tea with powerful stress-relieving properties due to its high content of the amino acid L-theanine.

Avocados

Avocados are rich in magnesium, a mineral that contributes to reducing levels of the stress hormone cortisol.

LIFESTYLE

Breathing training

Breathing training through yogic breathing (pranayama), for example, can help you better control your breathing and, thus, your cognitive function during exercise.

Diet

A healthy balanced diet packed with nutritious foods, which is also low in caffeine and alcohol, can significantly help reduce stress and hence slower your breathing rate throughout the day.

Sunlight viewing

Looking at the sun with no sunglasses on first thing in the morning can significantly help you reduce stress through the stress hormone cortisol regulation, slowing your breathing rate throughout the day

Why it's important for your goal

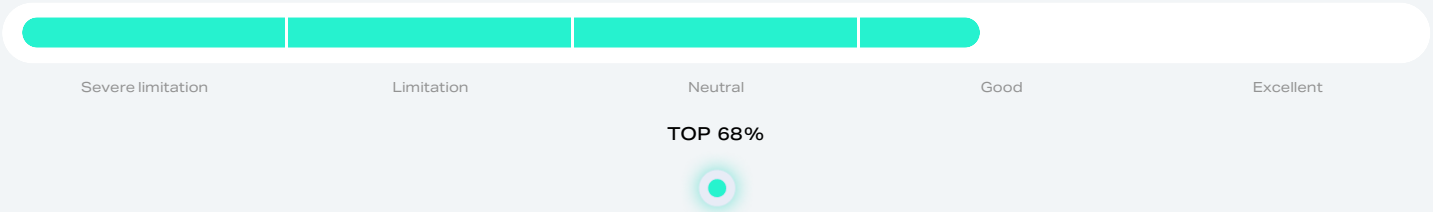
This metric is vital for your wellness because hyperventilation is considered one of the most common but under-diagnosed conditions that severely impact the quality of life in our society. It's estimated that 15% of the population chronically hyperventilates, with only a few knowing about it. Chronic hyperventilation reduces cognitive function at work, increases feelings of fatigue, and is associated with higher rates of anxiety and panic attacks

Scan to learn more

Scientific sources

- Zering J.C. et al., Cognitive control exertion on a graded exercise test, 1799-1807
- Nicolò A. et al., Respiratory frequency and tidal volume during exercise, Article number : 21
- Nicolò A. et al., The importance of respiratory rate monitoring, Article number : 6396

Breathing & Stability - 69% | Good



What it is

It's a gauge of how your breathing affects your posture, the likelihood of musculoskeletal injury, and lower back pain

How it is measured

The Breathing and Stability score is calculated by assessing your Breathing Rate across all training zones. The expected breathing frequency is up to 20 breaths per minute for exercise intensities in training zone 1, up to 25 breaths per minute in training zone 2, up to 31 breaths per minute in training zone 3, up to 39 breaths per minute in training zone 4, and up to 50 breaths per minute in training zone 5. For every breath per minute above the upper breathing rate limit in each training zone, the subject gets a 10% reduction in their breathing and stability score.

Recommendations to improve it

NUTRITION

Broccoli

Broccoli is rich in magnesium which helps the mind and body relax, lowering your breathing rate.

Dark chocolate

Dark chocolate is packed with essential nutrients, such as magnesium, a mineral that contributes to reducing levels of the stress hormone cortisol.

Fermented foods

Fermented foods, such as kefir and kimchi, are rich in probiotics which promote gut health and thus reduce stress and breathing frequency

LIFESTYLE

Meditation

Long-term meditation through breathing practices such as nasal breathing or box breathing can help you better control your breathing and slow your breathing rate.

Smoking cessation

Nicotine places more stress on your body by increasing physical arousal and, eventually, breathing rate.

Organization

Making a list or keeping a journal with your everyday activities and their completion status can help you better organize your time throughout the day, reducing stress and breathing rates.

Why it's important for your goal

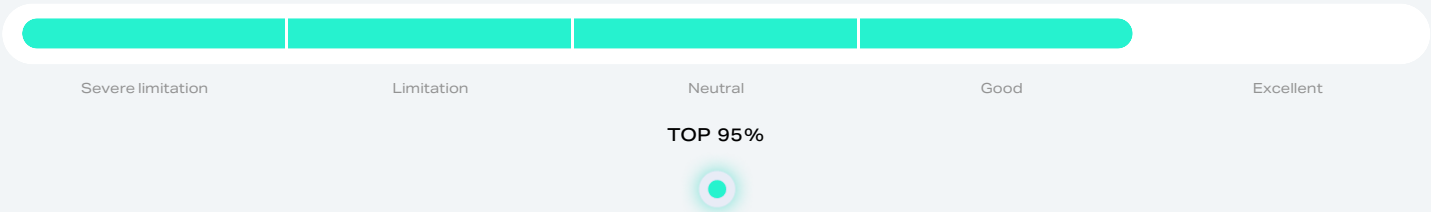
This metric is essential for your wellness because abnormal breathing patterns are the most significant risk factor for musculoskeletal problems like lower back pain which currently represents one of the most significant burden to health systems and critical factors in reducing the quality of life. Correct breathing will vastly improve posture, feelings of musculoskeletal pain, and quality of life.

Scan to learn more

Scientific sources

- Nicolò A. et al., Respiratory frequency during exercise, Article number : 922
- Anderson B.E. et al., The use of breathing exercises in low back pain, 452-458
- Beeckmans N. et al., Respiratory disorders in individuals with low back pain, 77-86

Respiratory Coordination - 80% | Excellent



What it is

It's a gauge of whether your breathing follows a normal pattern during training that does not negatively impact your posture, cognitive brain function, or muscle oxygenation

How it is measured

This is identified by analyzing your tidal volume or VTpeak in our platform at different exercise intensity zones, namely their zones 2 through 5, and evaluating whether it ranges below 60% of their predicted FVC in each of them. FVC is the maximum amount of air you can breathe out.

Recommendations to improve it

NUTRITION

Pumpkin

Pumpkins are rich in carotenoids, such as zeaxanthin, lutein, and beta-carotene, which can slow down the deterioration of lung functions and improve lung capacity.

Red cabbage

Red cabbage is rich in anthocyanin, an antioxidant that can slow down the deterioration of lung functions and improve lung capacity.

Turmeric

Turmeric is a superfood with anti-inflammatory properties that can increase lung capacity and improve lung health

LIFESTYLE

Smoking cessation

Smoking can cause a rapid decline in respiratory muscle blood supply and reduce your lung capacity through alterations in airflow and irritation of the airways.

Weight loss

Obesity causes mechanical compression of the diaphragm and lungs, leading to reduced lung capacity.

Meditation

Long-term meditation, where the subject concentrates on their breathing, i.e., pursed lip breathing or diaphragmatic breathing, can lead to increased lung capacity

Why it's important for your goal

Respiratory coordination is vital for your wellness because irregular breathing patterns during training, also known as hyperventilation, compromise brain oxygenation and destabilize your core. Lower brain oxygenation causes feelings of dizziness and fatigue. A destabilized core elevates the risk of injuries such as lower back pain.

Scan to learn more

Scientific sources

- Garcia-Retortillo S. et al., Cardiorespiratory coordination in maximal exercise, Article number: 387
- Barreiro T.J. et al., An approach to interpreting spirometry, 1107-1114
- David P. et al., Respiratory-related activities during post-exercise hyperventilation , 899-904

Training Program

He just enrolled in a regional gym because his orthopedic advised him to strengthen his legs for his knee injury. He just started a week ago with three exercise sessions per week. He does one 45-min cardio training at a constant speed of 5.5km/h with an incline of 2% and two 45-min resistance training sessions, where he does 2 machine-based exercises for all muscle groups with 2 sets of 12-15 reps.

Training Program

Resistance Training - 0x per week

Type	Sessions per week	Sets	Work time | Zone	Effort

Interval Training - 1x per week

Type	Sessions per week	Sets	Work time | Zone	Recovery time in between sets	Effort
Long	1	2-3	0|1	1:1/2	8

Cardio Training - 2x per week

Type	Sessions per week	Sets	Work time | Zone	Recovery time | Zone	Effort
Base	2	1-0	0|1	n/a	10

Workout description

Intervals

Short

They are very fast bouts of intense physical activity where your goal for every set is to get and stay in the highest end of zone 5 for approximately 30 seconds and then recover in zone 1 for 60 seconds. Your work and recovery time begin when you enter zone 5 and 1, respectively.

Medium

They are short bouts of intense physical activity where your goal for every set is to get and stay in the lower end of zone 5 for 1 to 4 minutes, depending on your fitness level, and then recover in zone 1 for the same time as your work duration. Your work and recovery time begin when you enter zone 4 and 1, respectively.

Long

They are long bouts of medium intensity where the goal for every set is to get and stay in zone 4 for approximately 10 minutes and then recover in zone 1 for about 5 minutes. Your work and recovery time begin when you enter zone 4 and 1, respectively.

Cardio

Base

It's a steady-state bout of physical activity that should last at least 45 minutes and take place in zone 2.

Moderate

It's a steady-state bout of physical activity that should last between 45 and 60 minutes and take place in zone 3.

Hard

It's a steady-state bout of physical activity that should last between 20 and 40 minutes and take place in zone 4.

Resistance Training

Hypertrophy

Resistance training with the intent to increase muscle size and total muscle mass. It's widely used by athletes and everyday people who look to increase muscle mass and prevent injuries.

Strength

Resistance training with the intent to increase one's maximal strength level. Increasing maximal strength greatly benefits every element of your physical performance, from carrying groceries to breaking athletic records.

Strength endurance

Resistance training with the intent to increase muscular endurance. It trains your ability to perform more repetitions against resistance for prolonged periods.

Training Program

Training Zones

Zone	Heart Rate (bpm)	Watts	Speed (ML/H)	Benefits	Feels like	When to use
Zone 5	188-192	0-0	0-0	Improves VO2max, Enhances fat-burning efficiency and cellular health, Increases fatigue threshold	Feels impossible to continue, completely out of breath, unable to talk	Short intervals
Zone 4	180-188	0-0	0-0	Increases fatigue threshold, Increases anaerobic threshold, Improves VO2max	Difficult to maintain exercise intensity, hard to speak more than a single word	Medium intervals, Heavy endurance
Zone 3	166-180	0-0	0-0	Improves heart fitness	On the verge of becoming uncomfortable , short of breath, can speak a sentence	Long intervals, Medium endurance
Zone 2	141-166	0-0	0-0	Enhances fat burning efficiency and cellular health, Improves recovery capacity	Feel like you can exercise for long periods of time, able to to talk and hold short conversations	Base
Zone 1	131-141	0-0	0-0	Recovery	Feels like you can maintain this intensity for hours, easy to breath and carry on a conversation	Recovery

Energy consumption & fueling

Zone	Fat burn (%)	Carb burn (%)	Average	Lower end	Upper end
Zone 5	12 %	88 %	12 kcal/min	9 kcal/min	15 kcal/min
Zone 4	12 %	88 %	10 kcal/min	4 kcal/min	13 kcal/min
Zone 3	26 %	74 %	8 kcal/min	4 kcal/min	12 kcal/min
Zone 2	54 %	46 %	8 kcal/min	4 kcal/min	11 kcal/min
Zone 1	91 %	9 %	5 kcal/min	1 kcal/min	11 kcal/min

Testing Schedule

In the next exercise measurement, which is recommended to be scheduled 15 days from now, provided that he follows the appropriate exercise recommendations, he is expected to have improved his recovery capacity as well as his breathing and stability and breathing and cognition metrics. After that, he is recommended to repeat the VO2max test in 3 months, when he is expected to have improved his VO2peak, cardiovascular fitness, high-intensity performance, and fat-burning efficiency.

Performance prediction

We analyze the core metrics related to oxygen flow through your body to quantify your overall athletic performance ability. The efficiency with which oxygen is transferred across your heart, lungs, and cells is the foundation of every type of athletic performance.

Estimated time to complete

5k	133
10k	150
Half marathon	220
Marathon	412

Calculated based on your maximal aerobic speed and speed at VT2.

Thresholds

	Units	23/02/2022
Fat-Max	at BPM	140
Ventilatory Threshold 1 (VT1)	at BPM	141
Ventilatory Threshold 2 (VT2) or anaerobic threshold)	at BPM	190
VO2 Peak	ml/min/kg	23
Heart rate max	at BPM	63

Fat-Max

The exercise intensity where a person burns the most amount of fat and the least amount of carbohydrate.

Ventilatory Threshold 1 (VT1)

The exercise intensity at which physical activity starts to be considered a workout.

VO2 Peak

The maximum oxygen consumption in milliliters per kilogram per minute (ml/min/kg) of body weight achieved during the test.

Ventilatory Threshold 2 (VT2) or anaerobic threshold)

The exercise intensity at which the body transitions into Zone 5 where anaerobic metabolism becomes a large part of the body's energy generation.