RED ON ATHLETE TESTING

READY FOR ANYTHING

WHERE WILL YOU FIND US?

The Red On Performance Centre is located just outside of Liverpool tucked away in Liverpool Road Studios:

Studio 28, Liverpool Road Studios, Liverpool, L23 5TD

WHO LEADS THE TESTING?

Dr Ash Cox oversees a full team of sports scientists and rehab instructors as the clinical lead at the Red On Performance Centre.

Dr Cox has been working in physical development for over 15 years. He has a history of working within elite sport at a national and international level across weightlifting, cycling, professional football and boxing. After helping redesign the rehabilitation and treatment pathway for the British Army, Dr Cox pursued a PhD in sports, exercise, and health sciences.

Dr Cox has published as lead author in leading international journals and regularly presents his work at global conferences. His work is largely focused on musculoskeletal health and has featured in government policy papers and rapid evidence reviews.

Dr Cox is still currently a lead researcher at a world leading university and oversees all of our testing functions.

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DOCTORS NOTES

What the Report Covers

Your performance report is a comprehensive physiological and biomechanical profile designed to bridge testing outcomes directly into actionable competitive performance.

Our assessment includes:

- Lactate Testing (Threshold and Maximal Response Curve)
- Understand exactly where your aerobic engine peaks and where fatigue thresholds emerge
- Body Composition Analysis
- Profile of lean mass, fat mass, and BMI for optimising power-to-weight ratio critical for endurance and hybrid athletes.
- Srength and Power Analysis
- Full audit of explosiveness (CMJ) and force development across incremental loaded squats: impulse, rate of force development (RFD), peak power (Pmax), and force-time characteristics
- Indirect Calorimetry (VO_2 and Substrate Utilisation)
- Real-time oxygen consumption (VO_2) and energy expenditure assessment to gauge fuel use (carbohydrate vs. fat) and aerobic efficiency

Each section is tightly integrated to create a true athletic signature, offering detailed training and competition guidance.

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Why This Matters — The Science

Lactate Testing:

- Lactate dynamics are critical for hybrid athletes. Studies show (Faude et al., 2009) that lactate thresholds predict endurance event performance more accurately than VO_2max alone.
- Knowing your exact IAT (Individual Anaerobic Threshold) allows you to precisely set race paces, preventing over-pacing and catastrophic fatigue.

Body Composition:

- Power-to-weight ratio is a major determinant of performance (Jones & Carter, 2000)
- Lower non-functional mass (excess fat) correlates strongly with better efficiency, running economy, and mechanical work output.
- Subtle changes in lean mass vs. fat mass can massively affect run times, sled push fatigue, and wall ball resilience

Strength and Power Profiling:

- Peak Power (Pmax), Rate of Force Development (RFD), and Impulse are central to heavy carry and push/pull events (Cormie et al., 2011)
- Strength endurance (holding mechanical output across fatigue) is now recognised as a separate predictor of success in hybrid competitions like Hyrox and CrossFit (Bell et al., 2020)

Indirect Calorimetry:

- Understanding VO_2 kinetics and substrate use lets you fuel smarter and race better
- Real-time data shows how much of your energy comes from carbohydrates vs fats — crucial for race nutrition planning and in-event fuelling decisions (Jeukendrup, 2011)


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BLOOD LACTATE TESTING

What:
A measurement of lactate levels in the blood, taken at rest and during exercise, to determine how efficiently the body clears lactate. This helps identify an individual's lactate threshold—the point at which lactate begins to accumulate in the blood faster than it can be cleared.

How:

- The test is performed using a small finger or earlobe prick to draw a blood sample at timed intervals of increasing effort.
- Blood lactate is measured at different intensities of exercise in an incremental test.
- The test continues until lactate accumulation reaches a high level, indicating anaerobic fatigue and will be stopped by the team.

Why:

- **For Athletes:** Determines endurance capabilities and helps tailor training intensity to improve all areas of performance. Athletes use lactate threshold data to optimise pacing strategies and training zones. This ensures training is completely individualised.
- **For General Fitness Enthusiasts:** Helps people train more efficiently by identifying the right intensity to build endurance without excessive fatigue. Can indicate metabolic efficiency and help those with cardiovascular or metabolic conditions understand how their body responds to exercise.

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VO2 MAX TESTING

What:
Measures the maximum volume of oxygen the body can use during intense exercise. It reflects aerobic capacity and overall cardiovascular fitness.

How:

- Performed on a treadmill, bike, ski erg, or rowing machine.
- The individual wears a mask connected to a metabolic cart that analyses oxygen intake and carbon dioxide output.
- The test follows an incremental protocol, increasing speed or resistance until exhaustion.

Why:

- **For Athletes:** Higher VO2 max values correlate with better endurance performance in sports like running, Hyrox, cycling, football and rowing. It helps athletes structure their training to increase oxygen utilisation.
- **For General Fitness Enthusiasts:** Understanding VO2 max helps individuals improve cardiovascular fitness and set realistic training goals. A higher VO2 max is linked to a lower risk of heart disease, diabetes, and early mortality. It’s one of the strongest indicators of overall health.

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STRENGTH AND POWER ANALYSIS

What:
A detailed assessment of an athlete's ability to generate force, speed, and power in both unloaded and loaded movements. It evaluates explosive capabilities and maximal strength potential.

How:

1. Countermovement Jump (CMJ) Test: Measures unloaded explosive power and neuromuscular efficiency via jump height and power output.
2. Incremental Squat Testing (Velocity-Based Profiling): Assesses strength and power across increasing loads. Key metrics like velocity, force, peak power, impulse and rate of force development are captured to predict 1RM using validated methods. This builds a profile from explosiveness to maximal force.

Why:
For Athletes: Identifies strength-speed imbalances crucial for sport-specific demands. Helps target weaknesses like low impulse or slow rate of force development to improve performance. Precise 1RM predictions allow for safer and more effective training load prescription.

For Hybrid Fitness Enthusiasts: Understanding strength and power profiles helps optimise performance in events requiring a balance of strength, power, and endurance. It allows for targeted training to maximise real-world racing outcomes.

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FULL ANALYSIS PACKAGE

Our Full Analysis Performance Testing Package provides cutting-edge insights into your fitness, strength, and endurance. Whether you're an athlete looking to optimise performance or someone who wants to understand your body better, these tests give you the data needed to train smarter and improve overall health.

What's Included?

- Blood Lactate Testing
- VO2 Max Testing
- Strength Analysis
- Power Analysis
- Grip Strength Assessment

Who Is This For?

Performance Based Athletes – Optimise training, enhance performance, and track progress with precision.

Fitness Enthusiasts – Get science-backed insights to train smarter and reach new goals.

Everyday Individuals – Improve health, strength, endurance, and longevity while reducing injury risk.

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Timelines if You Are X Weeks Out From Competition

- **> 12 Weeks:** Full strength development phase, aerobic base building, maximal power and RFD enhancement.
- **8–12 Weeks**: Begin lactate tolerance sessions, strength endurance layering, race-specific skill work.
- **4–8 Weeks:** Sharpen high-intensity outputs, station transitions under fatigue, simulate race environment, pacing calibrations.
- **< 4 Weeks:** Taper planning, efficiency training, sharpen technical elements (wall balls, lunges), precision fuelling protocols.

Your testing report guides what you focus on at each stage to maximise race readiness — no guesswork, no wasted sessions.

Why You Might Get Differing Results on Race Day

Even the best testing battery can differ slightly from race day outcomes because:

- Environmental Conditions: Heat, humidity, altitude, surface friction all affect outputs
- Cumulative Fatigue: Testing is controlled; racing includes variability from travel, nerves, and other stressors.
- Mental Fatigue and Competition Dynamics: Racing adds a psychological dimension: strategy, pacing errors, unexpected breaks.
- Equipment Differences: Shoes, sled surface drag, wall ball texture, venue setups all introduce micro-variables.

However — Testing provides the scientifically strongest predictor of potential and the clearest map of where to intervene.
It builds your engine, sharpens your weapons, and calibrates your performance window.


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