WARRIOR
PERFORMANCE LAB

HYROX
COACHING HANDBOOK

Station technique
& performance

TEST. ANALYZE.
TRAIN. RETEST.

A practical reference for coaches and athletes preparing for all eight stations.



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ILLUSTRATED EDITION

NOVEMBER 2026

Technique with a purpose

The Warrior Performance Lab coaching handbook

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Illustrated edition | November 2026
Design and app update: 14 November 2026. Research review in the source edition: 25 October 2026. Race specifications rechecked: 14 November 2026.

Purpose

Better station performance means completing the required work reliably while preserving the ability to run and perform the next task. A faster isolated split can be a poor trade if it produces longer rests, repeated invalid repetitions or a disproportionate slowdown afterward.

This resource gives coaches a framework for assessing all eight stations, selecting useful technique changes, developing the required physical capacities and testing whether those changes improve performance. Each station chapter connects movement mechanics with observable coaching problems, practice progressions and measurable outcomes. The Roxzone, running transitions and training structure receive separate treatment because their costs are easy to miss when analysis focuses only on the workout stations.

The intended reader is a coach working with healthy adult HYROX athletes. The race specification page concerns Singles Open and Pro. Doubles, Relay, Adaptive and youth formats require their own rulebooks and programming decisions. Exercise substitutions and reduced training loads are development tools, not alternative competition standards.

Coaching position

Use a technically competent, repeatable movement solution that fits the athlete and meets the event requirements. Judge a proposed improvement against the athlete's previous performance under comparable conditions. Visible effort, an unusual posture or a technique used by an elite competitor does not establish efficiency, injury risk or suitability for another athlete.

This is an applied coaching reference, not a clinical assessment manual or a systematic review. Exercise examples illustrate programming decisions; their doses have not been validated as optimal HYROX prescriptions.

This independently authored WPL handbook is not an official HYROX rulebook. Consult the current event rules and briefing for competition requirements.

Your guide to the handbook

Start with the athlete. Choose a station. Return to the workbook to turn an observation into a coaching decision.

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Why I wrote this

I wrote this handbook because I believe coaches and athletes need clearer connections between research, anatomy, physiology, and everyday training decisions.

There is an enormous amount of training advice available. What is often missing is the explanation behind it: why an exercise is being prescribed, what a technique cue is intended to change, who it may help, and how we will know whether it is working.

For me, the most important part of that conversation is the individual.

Two athletes can enter the same race and face the same stations while needing very different preparation. Their training history, physical capacity, movement experience, recovery, goals, and access to equipment all deserve consideration. A successful approach for one athlete provides something to investigate, not a prescription for everyone.

Understanding anatomy and physiology helps us ask better questions. Research helps us evaluate our assumptions. Coaching brings that knowledge into the athlete's circumstances through observation, communication, practice, and reassessment.

This handbook brings those elements together. Each station chapter connects the demands of the task with practical coaching observations, training options, and ways to assess the response. Throughout, I distinguish published findings, official movement standards, and coaching applications so readers can understand both the guidance and its limits.

My aim is to help coaches make thoughtful decisions and help athletes understand the purpose behind their training. I want readers to feel confident asking: What does this person need? Why have we chosen this approach? What evidence would lead us to adjust it?

That is the approach behind Warrior Performance Lab:

Test • Analyze • Train • Retest

Train by Science. Perform with Strategy.

Ayda Page
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About Ayda Page



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I am the founder of Warrior Performance Lab and the Warrior Lab App, a Level 2 HYROX Performance Coach, performance nutritionist, Master Trainer, and Stability, Mobility and Strength specialist.

My work brings together strength, endurance, movement practice, nutrition, and race preparation. Across more than 25 years of coaching, I have continued to learn from research, ongoing education, and the different people I coach.

I created WPL to help athletes understand their training and make decisions that fit their goals, experience, equipment, recovery, and everyday lives. I work with athletes in Boerne and the San Antonio area, and online.

This handbook reflects that approach: begin with the person, investigate the task, and review the response before deciding what comes next.

warriorperformancelab.com/about

The athlete at the center



The WPL performance wheel is a conceptual coaching framework. Its equal segments do not represent measured contributions, validated scores, or equal training time. The priority changes with the athlete and the question being investigated.

Start with the domain that best explains the current question, then check its connections. A station issue may involve skill, pacing, recovery, equipment, physical capacity, or several of these together. Body composition is one possible consideration, not an automatic weight-loss target.

Your pathway through this handbook

Begin with the athlete, then open the relevant chapter. Two athletes can perform the same station slowly for different reasons. One may need more familiarity with the task; another may need a different pace, more physical capacity or a more manageable training load. The purpose of this handbook is to help you make that distinction and decide what to investigate next.

On your first reading

1. Read Understanding the evidence and Race specifications and standards. Separate what is required in competition from what research supports and what remains a coaching interpretation.

2. Choose one station chapter that matches a current coaching question. Read its observations, possible explanations and practice options together.

3. Read Programming technique and physical capacity before adding work. Decide where the practice fits and what it replaces.

4. Use the workbook to agree on one outcome, one change and a review point with the athlete.

During an ongoing training block

Return to the station chapter when the athlete's question changes. Use the four-week application process as a review rhythm, adjusting its timing to the athlete's experience, recovery and race schedule. Read the examples to practise interpreting a result, rather than to copy a session.

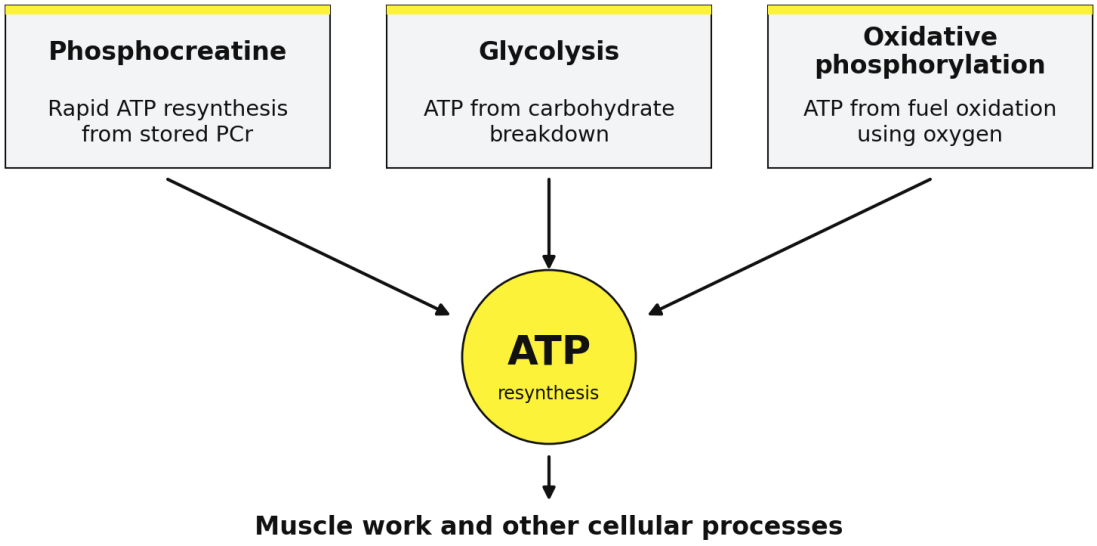
The question to carry into every chapter What does this athlete need now, and what observation would make us keep, change or stop this approach?

A useful decision can be to keep the current technique. Improvement does not require a new cue every week. Record the athlete's experience alongside the result so that the next decision reflects both performance and the ability to sustain the training.

Energy supply works together

ATP supply pathways work together

The contribution of each pathway changes with the task and the athlete.



Conceptual map: no fixed percentages or sequential switch-over times.

Conceptual physiology diagram. All three pathways contribute to ATP resynthesis; their relative contribution changes with the task. No station-specific percentages or fixed switch-over times are implied. Source: Gastin (2001).

Use physiology to frame the question

An intense effort does not switch off oxidative metabolism. Likewise, a long event can still include periods with a high demand for rapid ATP supply. The diagram describes interacting processes rather than separate boxes that take turns operating. (Gastin, 2001)

For coaching, record the actual task and the athlete's response: work duration, pacing, recovery, local fatigue, and following-run performance. Heart rate, a photograph, or a hard effort rating alone cannot establish the percentage supplied by each pathway.

The station chapters connect these ideas to observable decisions. They do not assign athletes a fixed energy-system identity or prescribe their training from one isolated number.

Understanding the evidence

What direct HYROX studies establish

Brandt and colleagues studied 11 recreational athletes in an Open simulation. Running occupied more time than the stations, and higher maximal oxygen uptake was associated with faster overall completion. Wall balls produced the highest measured heart rate, lactate and perceived exertion. The simulation used 75 wall balls for women, so its protocol does not exactly match the current 100-repetition Singles standard. The sample was small, running used a nonmotorized treadmill, and handgrip was the strength measure. These findings support examining endurance and late-race execution; they do not show that lower-body strength is unimportant or that a particular station technique is superior. The reported percentage of time in high-intensity categories should not be mistaken for an average heart rate of approximately 80% of maximum. (Brandt et al., 2025)

A 2026 analysis examined 39,696 PRO and ELITE race results across seven seasons. Running accounted for approximately half of total time in the top 100 results, while stations with substantial strength demands also differentiated performances, with their importance varying across the field. Race records identify patterns, not the training or movement changes that caused them. Multiple performances can belong to the same athlete, and competition conditions are not equivalent to a controlled experiment. Use such data to inform a needs analysis, rather than to prescribe every athlete the same training distribution. (Rappelt et al., 2026)

Fernández-Navarrete and colleagues reported a simulation involving 29 athletes. Their abstract describes high sustained cardiorespiratory strain, declining running speeds from kilometers one to five, and the highest composite strain at wall balls, sled push and burpees. A composite index is not a direct measurement of muscle damage or injury risk. Lower strain during running also does not make those segments easy. The accessible abstract supports broad demand profiling; detailed individual prescriptions require more information. (Fernández-Navarrete et al., 2026)

A world-champion case study used five runs interspersed with four stations. Running step rate varied following different exercises, but running economy did not uniformly deteriorate in the subsequent laboratory test. The single participant, modified event order and prior testing prevent broad conclusions. The useful coaching question is how a particular athlete responds to a station, rather than whether fatigue must produce one predictable running pattern. (Schwalm et al., 2026)

How to interpret the different source types

Source type	Appropriate use	Limit of the inference
HYROX studies	Understand measured race demands and associations	A correlation or case study does not validate a technique intervention
Biomechanical experiments	Explain how a task changes force, motion or muscle activity	Laboratory tasks and single efforts may differ from race conditions
Training reviews and position stands	Inform broad loading and recovery decisions	They do not establish a universal HYROX program
Official rulebooks	Determine legal performance and equipment specifications	Legality does not identify the fastest technique
Manufacturer instruction	Teach operation and basic ergometer movement	Technical instruction is not a comparative training trial

Translate the evidence into a decision

Separate the problem from its possible cause. A slowing sled may reflect friction, traction, load, fatigue or force capacity. A missed wall-ball target may reflect positioning, accuracy, local fatigue or pacing. Naming a weak muscle from a single video is rarely justified. Alter one constraint and observe what changes before adding corrective exercises.

Movement economy has a specific physiological meaning when assessed with metabolic measurements. Without those measurements, describe the outcome you actually observed: faster completion at a similar effort rating, fewer invalid repetitions, less rest or a better following run. Do not label a movement more economical solely because it looks smoother.

Surface electromyography describes recorded electrical activity under the study conditions. It does not, by itself, identify the best exercise for long-term adaptation or show that a movement prevents injury. Likewise, joint angles and trunk positions should be interpreted alongside task demands, symptoms, capacity and exposure. No single visible posture guarantees safety.

A practical coaching sequence

1. Define the task and the outcome that needs to improve.

2. Observe fresh execution, then a controlled repeat after relevant preceding work.

3. Identify a testable explanation and change one cue, load or task constraint.

4. Repeat under comparable conditions and record the result.

5. Confirm the result on another day before making it the athlete's race strategy.

This sequence is a coaching method, not a validated injury screen. New or worsening pain, faintness or loss of control warrants stopping and reassessment; persistent symptoms require an appropriately qualified clinician.

Race specifications and standards

Singles 2026/27. Kilograms; sled totals include sled. One 1 km run precedes each station. (HYROX, 2026/27)

Station	Work	Women Open	Women Pro and Men Open	Men Pro
SkiErg	1,000 m	-	-	-
Sled push	50 m	102	152	202
Sled pull	50 m	78	103	153
Burpee broad jump	80 m	-	-	-
Row	1,000 m	-	-	-
Farmers carry	200 m	2 × 16	2 × 24	2 × 32
Sandbag lunge	100 m	10	20	30
Wall balls	100 reps	4	6	9

Wall-ball targets: women 2.70 m; men 3.00 m. Squat below parallel; hit the correct target. Lunges alternate with rear-knee contact and full hip/knee extension; no intermediate steps. Keep the sandbag on both shoulders. Burpees allow step-outs and knee assistance; chest contacts ground. Jump takeoff/landing use both feet, stagger no more than 5 cm; no extra steps. First burpee each section: hands behind the line. Later burpees: palms no more than 30 cm ahead of front toes. Feet cannot pass fingertips. Sleds clear each line; pull standing inside the box. After skiing, remain on the platform and raise an arm for judge confirmation. After rowing, remain seated until the judge confirms completion. Carry bells at sides; return handles upright.

Apply the correct event requirements

Use the linked official rulebook for the complete movement descriptions, penalties and conduct requirements. Check the event briefing and course map before preparing the athlete's final race plan. A training session cannot reproduce every venue's surface, equipment placement or congestion.

Keep a clear distinction between learning and competition. A lighter ball, shortened carry or supported lunge may be appropriate for development, but mark that session as modified when comparing results. Record the actual equipment and load rather than calling every workout “race standard.”

For the station chapters that follow, all drills and dosing suggestions are coaching applications unless a research or technical source is cited. Select exercises for the athlete's current capacity and objectives, and refer back to this page for the competition specifications.

STATION 01 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Compare the opening and final strokes at the intended output.

TEST

Change one pacing or sequencing cue while keeping the task comparable.

MEASURE

Split, cadence, drag factor, local effort, and the following run.

Task and coaching priority

The first station requires 1,000 m of skiing after the opening kilometer of running. The coaching objective is a repeatable output that fits the athlete's whole-race plan. Judge a SkiErg change by the quality of the station and the run that follows, including perceived effort, local fatigue and the athlete's ability to regain a planned running rhythm. A faster isolated split is useful only when its cost is acceptable.

Athletes should learn the movement while fresh before practicing it after running. During race preparation, use the same footwear, realistic entry position and familiar monitor display. Rehearse the completion procedure described in the race specifications. These small procedural skills reduce avoidable confusion without requiring the athlete to pull harder.

Movement sequence and mechanical demands

Concept2 teaches a coordinated whole-body pull: begin tall with bent arms, initiate through the upper body and trunk, hinge at the hips with knee contribution, finish beside the thighs, and return smoothly. Rising onto the toes can occur; heels need not remain planted throughout. The hands should not be forced behind the body (Concept2, SkiErg Technique).

Leg participation should not be dismissed as a technical fault. In 11 elite skiers, restricting knee and ankle motion reduced double-poling performance compared with unrestricted movement. However, this treadmill roller-ski study cannot establish optimal SkiErg mechanics during HYROX (Holmberg et al., 2006).

The following assessments are coaching synthesis. Look for a movement the athlete can reproduce at the intended output, rather than matching one body shape. Compare the beginning and end of a bout. Consider how body proportions, available range, familiarity and fatigue may explain what you see. Avoid diagnosing weak muscles from appearance alone.

Observe and test

Observation	Possible explanation	Coaching test
Split deteriorates while effort rises	Starting pace was too ambitious, or local fatigue is accumulating	Repeat at a slightly slower opening target; compare the final third and subsequent run
One side repeatedly feels more fatigued	Asymmetric setup, grip, movement strategy or a symptom affecting effort	Check position and handle reach; film from the front at easy effort before adding load
Athlete cannot reproduce the planned rhythm	Unfamiliar output, too many simultaneous cues or insufficient recovery	Use brief bouts with one cue and full reset; ask the athlete to describe the sensation
A faster split is followed by poorer running	Greater station effort may exceed the athlete's current race tolerance	Repeat the station-run combination on a comparable day with a more conservative ski target

Progression and regression

Begin with brief, easy repetitions that allow discussion and feedback. Progress first by making the stroke and output more repeatable; then extend bout duration. Introduce a short preceding run only after the athlete can reproduce the fresh task. Full-distance race simulations are one option later in preparation, not a prerequisite for every training week.

If quality deteriorates, shorten the bout, lower the target output or provide more recovery. Seated skiing is a different task with different loading demands; it may be an appropriate adaptation, but it does not automatically reproduce the standing race station. Resolve pain or meaningful movement restriction before progressing intensity.

Example coached session

This is a coaching example, not a research-tested optimal prescription. Use it for an athlete already comfortable with running and the SkiErg. After an easy general warm-up and several comfortable practice pulls, complete three rounds of 400 m easy running followed by 250 m skiing at RPE 5-6 out of 10. Recover for 2-3 minutes between rounds, extending recovery when needed to restore controlled breathing and useful attention. These are practice bouts, not a test to exhaustion.

In round one, record the athlete's natural execution. In round two, test one agreed adjustment. In round three, repeat the more promising option rather than adding another change. Stop the comparison when pain appears, equipment control is lost, or the athlete can no longer reproduce the task despite reducing effort. An unusually poor response calls for checking readiness and the broader training load.

Performance measures and evidence limits

Record average split, stroke rate, drag factor, RPE, local fatigue, and the pace and perceived effort of the subsequent run. The damper changes airflow and stroke feel; drag factor can differ between machines at the same lever position. Neither lever number nor drag factor sets exercise intensity (Concept2, All About Damper Setting and Drag Factor).

Repeat promising changes before adopting them. Manufacturer guidance supports basic instruction, and skiing studies offer related mechanical evidence. Neither establishes a universal HYROX cadence, damper setting, recovery ratio or superior technique for every athlete.

STATION 02 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Separate getting the sled moving from keeping it moving.

TEST

Compare one setup change on the same sled, lane and load.

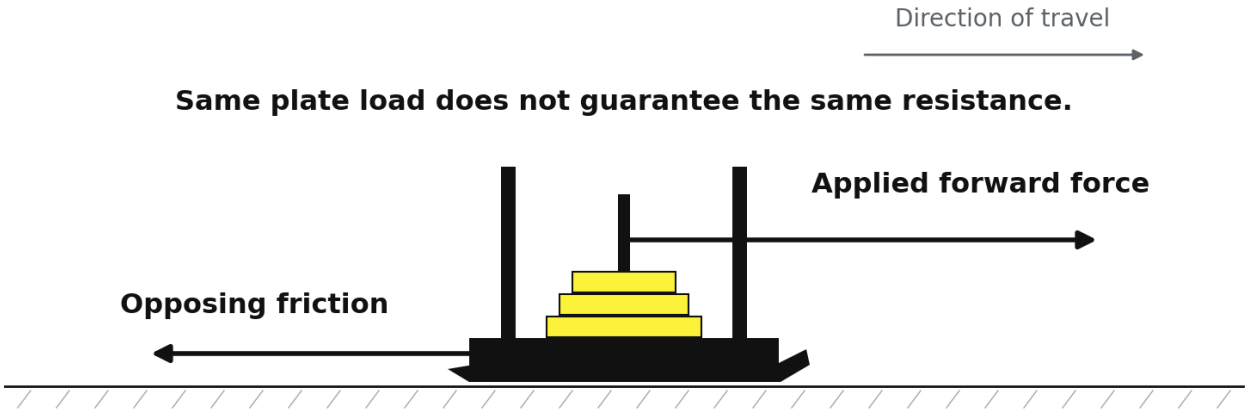
MEASURE

Start time, stationary time, slips, length time, effort and the next run.

The same mass can create a different task

Sled mass is only part of the task

Surface, equipment and force direction also influence resistance.



Compare starts and continuous travel separately.

For a retest, record the sled, total mass, surface and footwear.

Horizontal components only. Vertical forces are omitted.
Arrows are schematic and do not represent measured force magnitudes.

Horizontal force components only. Arrow lengths are schematic, not measured. Mechanical foundation: Andre et al. (2013); individual loading context: Cahill et al. (2021).

Surface, sled contact materials, traction and start conditions affect what the athlete must overcome. A position that works on one lane may need reassessment on another. There is no universal torso angle or hand position established for this race station.

Performance objective

Move the sled consistently while controlling the cost to the next run. Assess starting, continuous travel and turns separately: an athlete may have sufficient capacity once moving but lose substantial time repeatedly breaking the sled free. The objective is an effective whole segment, rather than the most aggressive first few steps.

Mechanics and force application

The athlete applies force through the handles while the feet obtain traction against the floor. The useful forward component must overcome the sled's resistance. That resistance depends on the sled, surface, contact materials and conditions as well as its mass. Consequently, identical plate loads can produce very different tasks. Body-mass percentages and gym split times are incomplete descriptions unless the equipment and surface are also recorded.

A forward body inclination can help the athlete direct force through the handles, but there is no established universal torso angle or handle position for HYROX. Straight-arm and bent-arm approaches can both be workable. Select a position that allows repeated leg drive, adequate traction and a controllable trunk without shoulder discomfort. A position that is effective for the first few meters may become costly when repeated.

Observe where the athlete's feet contact relative to the body and whether each step produces useful sled displacement. Excessively long steps may disrupt continuity; very rapid steps with little displacement may indicate insufficient force or poor traction. “Short steps” is a cue to test, not a technical standard. Avoid coaching a fixed cadence before understanding why the sled is stalling.

In 90 adolescent male athletes, the loads producing a given reduction in sled-push speed varied substantially between individuals. This supports individualized load selection, but short sprint trials are not equivalent to an adult race station following running. The study does not establish a HYROX loading threshold or ideal posture. (Cahill et al., 2021)

Observe before changing technique

Observation	Possible explanation	Coaching test
Sled stalls at every start	Excessive resistance, setup or traction problem	Reduce load and repeat the same start with a different foot position
Feet slip while effort rises	Surface and footwear interaction	Check the lane and try a less abrupt start before increasing force
Upper body changes position each step	Load exceeds current ability to maintain the chosen position	Use a lighter sled and compare handle positions
First length is fast but later lengths collapse	Opening pace or insufficient repeat capacity	Repeat with a deliberately restrained first length and timed rests

Progression and supporting strength

Teach setup and one smooth start on a light sled before adding repeated lengths. Increase the resistance only when the athlete can maintain purposeful movement and reproduce the result. Next, practice turns and re-entry. Finally, introduce a controlled preceding run. Changing load, surface and accumulated fatigue together prevents a clear interpretation of progress.

Squats, split squats, step-ups and hip-dominant lifts can develop general lower-body capacity. Choose them from the athlete's assessment; none is a validated replacement for exposure to the sled itself. If the sled cannot be moved under the current conditions, repeated maximal failed attempts are a poor technique drill. Reduce the task and build a successful progression.

Example coached session

After a general warm-up and two easy practice lengths, complete four 12.5 m pushes at a load allowing continuous movement at an effort of about 6-7 out of 10. Rest 90-120 seconds between lengths. Film one side view and time the start plus the full length. Use the same lane and direction where possible.

On a later session, compare two blocks of a controlled 400 m run followed by two push lengths, with three minutes between blocks. Keep the first block's run pace and load unchanged in the second. This is a practical progression, not a research-validated test. Reduce the load or end the block if repeated stalling, slipping, pain or loss of control prevents the intended task.

Evaluate the result

Record equipment, surface, sled total mass, footwear, length times, stationary time and effort. Repeat the same short run afterward when evaluating race transfer. Favor a setup that gives a reproducible combined result; a slightly slower push can be useful if it substantially improves the subsequent run. Do not rank athletes from sled times recorded on different surfaces.

STATION 03 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Follow the hands, feet, rope slack and resets as one sequence.

TEST

Compare a controlled pull and reset under matched resistance.

MEASURE

Total time, moving time, resets, local grip effort and following-run response.

Performance objective

Transfer force through the rope, manage available space and maintain useful sled movement. Pulling capacity, grip, balance and rope handling interact. An athlete may be strong enough to move the load but lose time because resets are poorly organized or the rope becomes trapped near the feet.

Mechanics and technique options

Pulling through the arms, shifting body mass backward and using controlled leg movement can all contribute. Their relative contribution depends on resistance, grip, athlete dimensions and the permitted working space. A hand-over-hand approach can maintain continuous travel; a larger coordinated pull can be useful when resistance is high. Neither should be declared universally superior without a comparison under the athlete's conditions.

Begin with enough tension to remove slack, establish balance and then apply force progressively. Sudden jerks may cause the athlete to step unexpectedly or lose the chosen stance. Keep hands and rope clear of the feet during resets. Avoid wrapping the rope around the hands or body. Practice where the slack will fall so that organization does not depend on improvisation under fatigue.

Use a trunk position the athlete can control and reproduce. Visible spinal movement is not, by itself, a diagnosis of injury risk; equally, the coach should not encourage repeated uncontrolled motion under a load the athlete cannot manage. A useful cue is “move the sled, then recover your position.” Its value is whether it improves execution, rather than whether it produces a particular appearance.

Mechanical sled research distinguishes the force required to initiate movement from the force required to sustain it. The experiment used a winch, not athletes, and does not establish an optimal rope-pull technique. Its practical implication is to standardize the equipment and surface before comparing performances. (Andre et al., 2013)

Observe before changing technique

Observation	Possible explanation	Coaching test
Arms tire before the sled travels consistently	Grip demand, excessive resistance or inefficient coordination	Compare a lighter continuous pull with a coordinated step-and-pull approach
Athlete repeatedly loses balance	Abrupt force, stance or poorly timed reset	Slow the first pull and rehearse a stable reset without time pressure
Rope crosses the feet	Slack management problem	Rehearse short unloaded sequences while placing slack clear of the stance
Sled moves but total time remains slow	Long pauses or repeated setup changes	Separate moving time from reset time on video

Progression and supporting work

Start with rope handling and several controlled pulls using a resistance that permits deliberate movement. Add distance before demanding race-speed repetitions. Train both an initial setup and a mid-station reset, since they solve different problems. A coach should also observe the final pull, when attention may shift prematurely toward leaving the station.

Rows, pulldowns and carries can develop relevant general capacities. Select grip work that the athlete can recover from without undermining key pulling or strength sessions. Rope diameter, surface condition and hand comfort affect the task, so a long dead hang is not a complete readiness test for the race pull.

Where suitable sled access is limited, a cable row combined with controlled backward steps can rehearse coordination in a clear space. It does not reproduce sled friction or race rope handling. Label substitute work accurately and include specific practice when equipment becomes available.

Example coached session

Warm up the shoulders, trunk and legs, then rehearse two easy pulls. Complete four short rope-pull intervals of approximately 20-30 seconds at an effort of 6-7 out of 10, resting 90 seconds. Use a resistance that allows the planned technique and reset. Film the feet and hands as well as the sled.

Compare two approaches over equal distances on a separate day, reversing their order on a repeat visit to reduce a simple first-versus-second fatigue effect. Keep load and surface constant. Stop a trial when grip becomes unreliable, rope management becomes hazardous or symptoms develop. Do not turn the comparison into a maximal test of how much uncontrolled movement the athlete can tolerate.

Evaluate the result

Record total time, moving time, reset count, grip effort and the following run. If a technique is faster only when fresh, retain it as a possible development option rather than immediately making it the race plan. Choose the approach that remains controllable and effective at the resistance and fatigue level relevant to the athlete.

STATION 04 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Separate floor transfers, jump length and pauses.

TEST

Compare a repeatable jump distance under matched conditions.

MEASURE

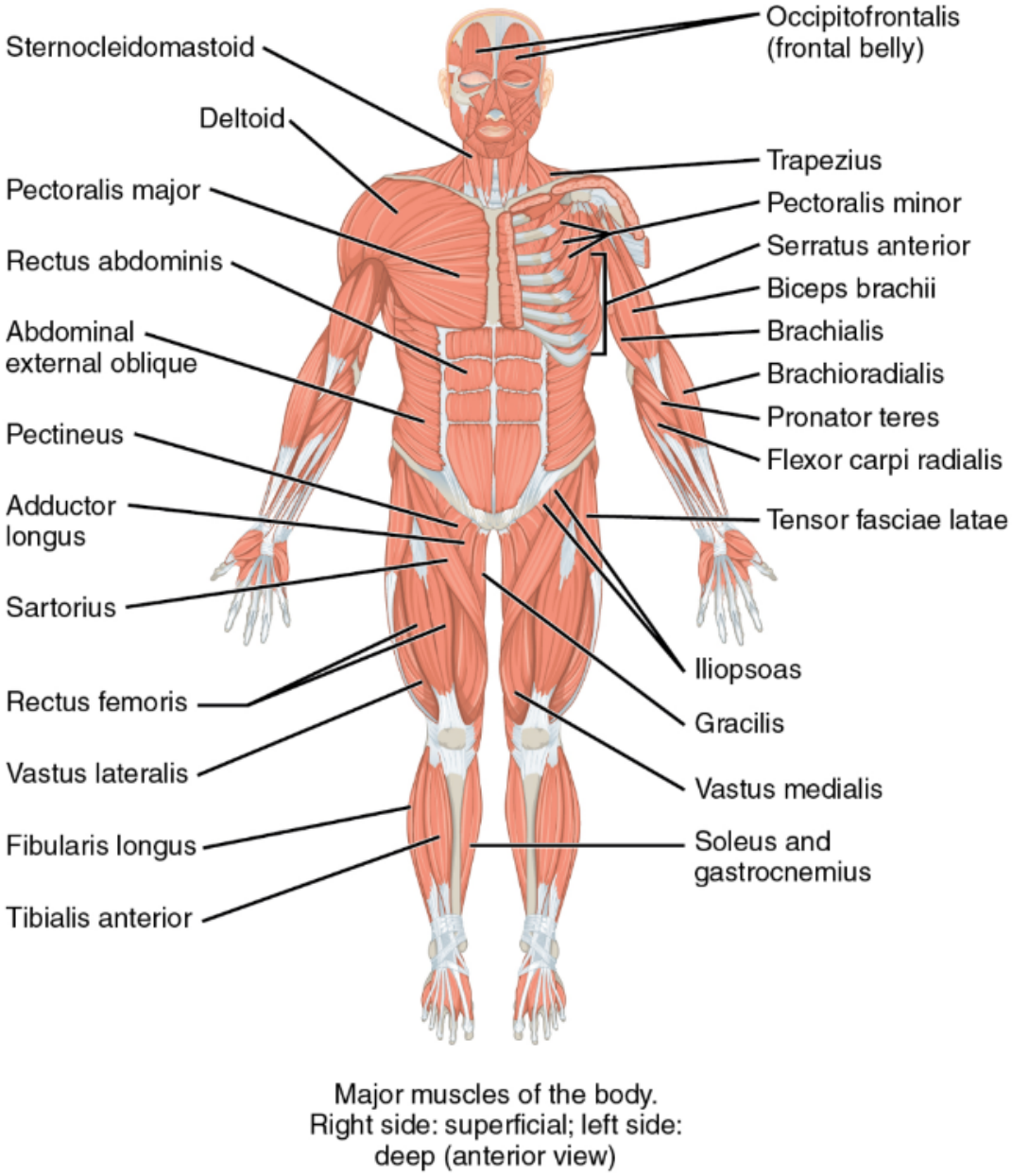
Time, valid repetitions, pause time, effort and the following run.

Anatomy in context



Schematic muscle roles vary across descent, floor contact, takeoff and landing. This illustration is a teaching aid, not a measured activation map.

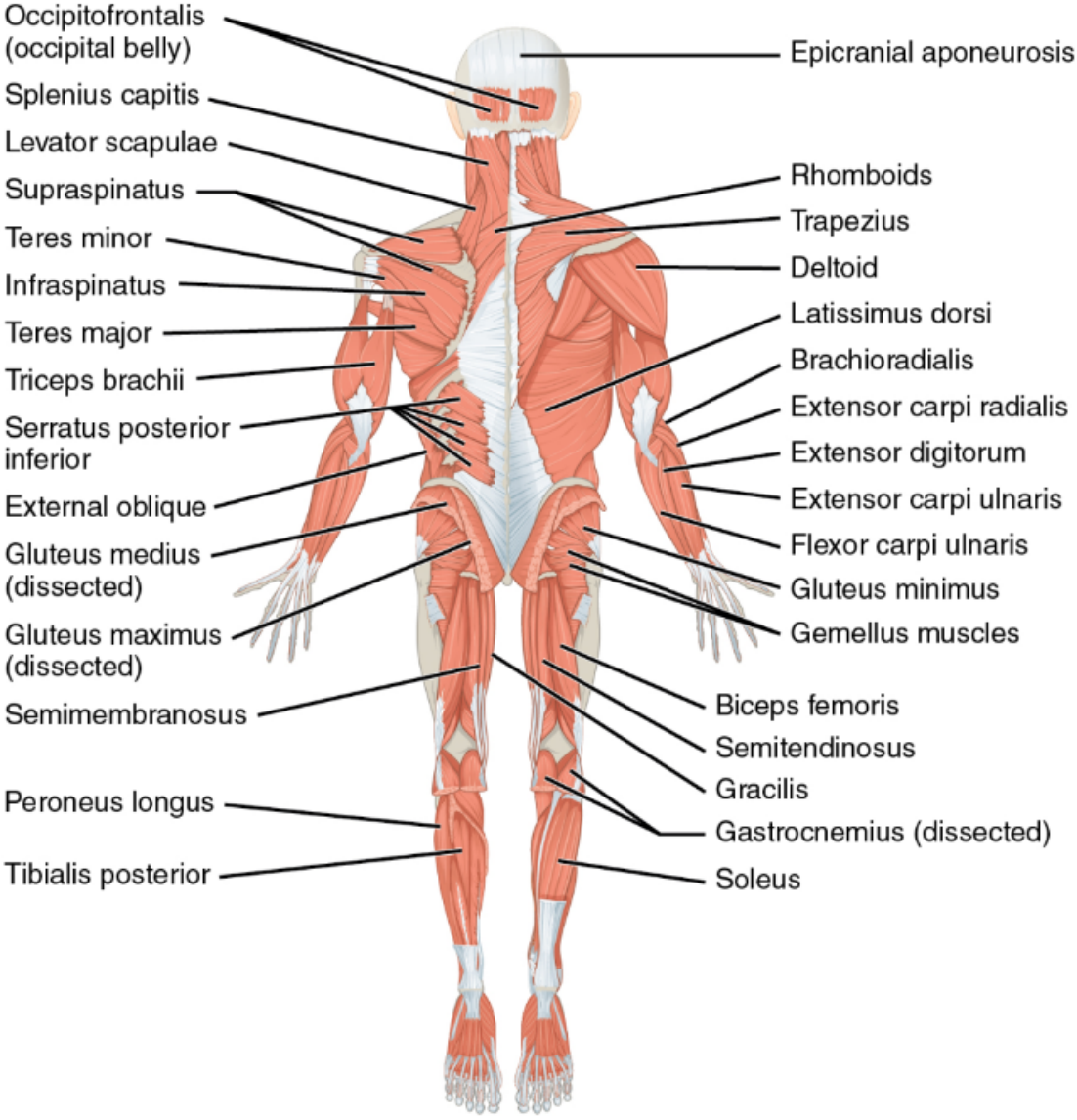
Anterior anatomy



Major muscles of the body. Right side: superficial; left side: deep (anterior view)

Anatomy identifies structures; it does not quantify muscle activation during a burpee broad jump. Source: OpenStax, Anatomy and Physiology, Figure 11.5, CC BY 4.0. Panel enlarged from the supplied WPL plate; anatomical labels unchanged. Full source and license links appear in References.

Posterior anatomy



Major muscles of the body. Right side: superficial; left side: deep (posterior view)

The superficial and dissected views explain muscle locations. They are anatomical references, not a display of measured activity in a particular repetition. Source: OpenStax, Anatomy and Physiology, Figure 11.5, CC BY 4.0. Panel enlarged; labels unchanged.

Connect anatomy to the task

01

LOWER TO FLOOR



Pectoralis major, anterior deltoid and triceps help control the descent.

Scapular and trunk muscles organize hand support.

02

RETURN & RISE



Hip/knee flexion brings the feet toward the hands.

Hip flexors, trunk and pushing muscles coordinate the transition.

03

TAKEOFF



Gluteals, quadriceps and plantarflexors contribute to propulsion.

Hip/knee extension and ankle plantarflexion; arm swing assists.

04

LANDING



Hip, knee and ankle muscles manage braking and balance.

Quadriceps, gluteals, calves and hamstrings contribute to coordinated control.

WPL functional interpretation. Schematic side views; takeoff and landing are bilateral. Joint motion alone does not reveal muscle-fibre shortening or tendon energy return. Adjacent jump evidence: Robertson and Fleming (1987); Ashby and Heegaard (2002).

Task and coaching priority

The burpee broad jump combines repeated floor transfers with horizontal propulsion. It arrives after the fourth run, when the athlete has already completed the SkiErg and both sled stations. Coaching should address the complete movement cycle and its effect on the following run. A longer jump reduces the number of floor transfers needed to cover a given distance, but it can also require more preparation, effort and landing control. The useful target is repeatable forward progress with valid repetitions, not maximum jump distance on every attempt.

Biomechanics and execution

Divide each repetition into descent, floor contact, recovery of the feet, takeoff and landing. During descent, the upper limbs accept load as the athlete lowers the body. Coach a controlled transfer of weight into the hands rather than an uncontrolled fall onto the chest. The return from the floor involves the shoulders, elbows, trunk, hips and legs; it should not automatically be taught as a strict push-up. Athletes can rehearse different rule-compliant floor-transfer strategies and compare their speed and effort.

Before takeoff, the athlete needs a balanced position from which the legs can produce forward and upward impulse. A brief stationary reset can be useful when it restores balance; eliminating every pause is not the overriding objective. Coordinate the arm swing with leg extension, and direct the jump along the lane. In a small standing-long-jump experiment, free arm movement improved distance compared with restricted arms, but the study involved three men performing isolated jumps, not repeated HYROX burpees (Ashby and Heegaard, 2002).

Land with enough hip, knee and ankle movement to regain control and prepare the next floor transfer. A deliberately long reach of the feet can create a landing that requires a backward correction before the next repetition. Film several consecutive cycles from the side and front: one attractive repetition does not establish that the technique is sustainable. Choose one cue at a time, such as “land ready for the next rep,” and assess its effect.

Observation and coaching test

Observation	Possible explanation	Coaching test
Jump distance falls while pauses lengthen	Opening pace exceeds repeatable capacity; floor transfers may be the main limiter	Repeat a short set with a slightly slower opening cadence and compare total time and final repetitions
Long jumps require extra balance corrections	The chosen distance exceeds current landing control	Reduce jump distance slightly and assess uninterrupted forward progress
Floor phase becomes progressively slower	Upper-body endurance, movement strategy or general fatigue may contribute	Compare two legal floor-transfer strategies when fresh, then repeat the better-tolerated option after a controlled run

Progression and regression

Teach the floor transfer and the broad jump separately before linking them. Elevated-hand burpees and small controlled jumps can reduce the initial demand, but mark these as training modifications. Progress to short, rule-compliant sequences, then longer distances, and finally controlled run-to-station combinations. Increase one demand at a time. Additional maximal jumps should have a separate power-training purpose and sufficient recovery; they should not simply be added to an already exhausting session.

WPL coached session example

After a general warm-up, complete three sets of three comfortable broad jumps, walking back between repetitions and resting 60 seconds between sets. Then perform four rounds of a 200 m easy-to-moderate run followed by 10 m of burpee broad jumps at RPE 6-7 out of 10. Rest 90 seconds between rounds. Use less distance or a modified floor transfer if necessary; keep the final round technically comparable to the first. Stop the set for pain, loss of landing control, repeated invalid repetitions or inability to maintain the planned effort. This is a coaching example, not a research-validated protocol.

Metrics and evidence limits

Record seconds per 10 m, repetitions per 10 m, pause time, valid-repetition rate and RPE. Compare the following run under similar conditions. Do not interpret fewer burpees alone as greater efficiency. Current evidence does not establish one universally optimal HYROX jump distance, floor-transfer method or breathing rhythm; select them through repeated athlete-specific trials.

STATION 05 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Watch the handle, seat and trunk through the whole stroke.

TEST

Use one cue and compare repeated output at a manageable effort.

MEASURE

Split, cadence, drag factor, transition time and following-run response.

Task and coaching priority

The fifth station requires 1,000 m of rowing after the fifth kilometer of running. Four previous stations have already contributed to the athlete's workload. Sitting down changes the movement task; it does not make rowing a recovery interval. The coach must balance station speed against effort, movement control and the athlete's ability to resume running.

A useful row plan includes more than a target split. Practice entry, foot-strap adjustment, the first few strokes, a settled middle section and a controlled exit following the completion procedure. Choose a monitor display the athlete understands and rehearse a response to starting too fast. Reducing uncertainty can improve execution even when average power remains unchanged.

Movement sequence and mechanical demands

Concept2 describes a blended legs-body-arms drive and an arms-body-legs recovery. At the catch, the trunk inclines from the hips, the arms are straight and the shins approach vertical; heels may rise. The finish uses a modest backward lean and a relaxed grip with the handle below the ribs. On recovery, the hands clear the knees before the knees bend (Concept2, Indoor Rowing Technique).

Avoid assigning fixed percentages of power to the legs, trunk and arms. Watch whether the athlete transfers effort into consistent handle movement and a reproducible output. Technique should accommodate the athlete's proportions and comfortable range. A rigid imitation of another rower can create a new problem without improving the station.

In a step-test study of 19 elite male rowers, lumbar flexion increased as exercise progressed, with greater change on the ergometer than in a single scull. This supports observing technique under fatigue, but does not show that a particular spinal position causes injury or that a cue prevents it (Wilson et al., 2013).

Observe and test

The following matrix provides coaching hypotheses, not diagnoses.

Observation	Possible explanation	Coaching test
Output varies substantially from stroke to stroke	Pacing uncertainty, inconsistent effort or unfamiliar movement timing	Ask for several deliberately similar strokes at easy effort and review the resulting split
Athlete reports excessive hand or forearm fatigue	Unnecessary grip tension, unfamiliar exposure or an overly demanding output	Repeat a short easy bout while consciously relaxing the hands between drives
Position changes markedly late in a bout	Fatigue, discomfort, increasing effort or a setup that is difficult to sustain	Compare short fresh and later clips, then shorten the bout or reduce the target
Fast row split produces a slow, labored run	The selected station effort may be too expensive for this athlete	Compare two conservative row targets with the same follow-on run and adequate recovery

Progression and regression

Start with manageable bouts at a conversational effort and enough rest for feedback. Use brief isolated movement drills only when they address an observed problem, then reconnect the full stroke. Progress toward longer continuous work after the athlete can maintain an intended output without repeatedly needing the coach to reset technique.

Next, add a short run before or after rowing while keeping the total workload manageable. Later sessions can include a fuller race sequence. Increase one demand at a time: duration, output, preceding fatigue or transition complexity. When quality falls, return to a simpler combination rather than solving every problem by raising the damper.

Example coached session

This is an illustrative session for a trained athlete, not a validated HYROX protocol. After warming up, complete three rounds of 250 m rowing at RPE 5-6 out of 10, followed by 400 m running at a predetermined comfortable pace. Recover 3 minutes between rounds, extending recovery if necessary to regain controlled breathing and meaningful technique feedback. Standardize the equipment setup and running route.

Use the first round as the baseline. In the second, change one variable, such as a pacing cue; repeat the better option in the third. Do not simultaneously alter cadence, drag factor and movement instructions. Stop or modify the session for pain, loss of equipment control, or a repeated inability to complete the intended practice at the planned effort. Compare the combined result, not just the faster rowing split.

Performance measures and evidence limits

Log average split, cadence, drag factor, total rowing time, transition time, RPE and follow-on running response. Add video observations sparingly: one or two clearly defined behaviors are easier to reassess than an extensive fault list. Keep the viewing angle and filming position consistent.

Interpret a poor split in context. Fatigue, pacing, unfamiliarity and readiness can affect output as well as movement execution. Manufacturer instruction provides a starting framework; the small kinematic study describes fatigue-related movement changes. Neither defines a universal HYROX stroke rate, injury-free posture or fixed time advantage from a particular rowing strategy.

STATION 06 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Ask whether grip, implement control or whole-body effort limits the task.

TEST

Change one pacing or planned-rest decision under matched conditions.

MEASURE

Moving time, set-downs, turn time, grip effort and the next run.

Task and coaching priority

The carry combines locomotion with a sustained bilateral grip demand. Performance depends on securing the implements, covering the course, managing turns and completing any necessary rests efficiently. A fast first length has little value if repeated grip failures follow. Coach the complete station and its exit, including pickup and replacement, rather than judging only walking speed.

Separate three potential constraints: hand or forearm fatigue, loss of implement control, and whole-body effort. Ask what forced the athlete to slow or stop. A carry completed with comfortable breathing can still exhaust grip; a strong static hold does not guarantee efficient walking or turning. Neither observation alone identifies the training solution.

Movement mechanics

Pick up the bells with a balanced stance and a controlled combination of hip and knee extension. Establish a secure grip before accelerating. Let the arms support the load without deliberately curling it; find a comfortable shoulder position rather than forcing the shoulder blades maximally back and down. The trunk controls changes in orientation while the feet repeatedly establish a new base of support.

The implements move with the athlete, so some oscillation is expected. The useful target is predictable movement that preserves grip and clearance from the legs, not absolute stillness. Adjust pace and step length together. At turns, reduce speed enough to maintain control and practice the actual turn geometry. A narrow training lane with frequent turns is a different task from a longer straight course.

Winwood et al. (2014) observed shorter strides and higher stride rates during farmers walking than unloaded walking in six male strongman athletes. This supports treating loaded gait as a distinct task; it does not provide a universal cadence for HYROX.

Observation and coaching tests

Observation	Possible explanation	Coaching test
Bells strike the thighs or swing unpredictably	Pace, step width, handle position or fatigue may be contributing	Repeat a short length at slightly lower speed, keeping load constant; compare control and time
Grip fails despite manageable breathing	Local capacity, handle dimensions, moisture or excessive initial pace may matter	Compare equal-distance bouts with matched implements and a planned early rest versus reactive rests
Pace drops mainly around turns	Turning skill or route design may dominate the split	Time straight and turning segments separately; rehearse controlled direction changes

Treat these explanations as hypotheses. Video cannot diagnose a weak core, and a small visible asymmetry does not establish injury risk. Ask about symptoms and compare repeated trials before changing the program.

Progression and regression

Begin with short, controlled carries using a load the athlete can lift and replace confidently. Increase distance before adding speed when grip or handling is the main limitation. If race load itself is the obstacle, develop shorter exposures at that load while maintaining easier longer carries separately. Change one primary variable at a time: load, distance, pace or preceding exercise.

Static holds can supplement grip training but omit gait and turns. Unilateral carries alter the task and should be treated as assistance work. Progress to the relevant paired implements before using the session to predict race performance. Practice a planned controlled set-down before the grip reaches involuntary release; keep the surrounding area clear.

Coached session example

This WPL coaching example is a starting point, not a research-validated protocol. After warming up, complete four rounds of a 200 m controlled run, a 40 m carry and a further 200 m run. Rest 2-3 minutes between rounds. Use a carry load that allows secure handling throughout, with overall effort around RPE 6-7 out of 10.

Record each segment separately. In the first two rounds, use the athlete's usual pace; in the next two, test one modest pace adjustment. Stop the carry if grip release becomes uncontrolled, bells repeatedly strike the legs, balance cannot be recovered, or pain appears. Reduce load or distance before adding more rounds.

Metrics and evidence limits

Track moving time, stationary time, set-down count, longest controlled carry distance, turn time, local grip effort and the next run split. Standardize implement type, handle, load, distance and surface. Retest on another day before accepting a small improvement. Strongman biomechanics are indirect evidence: they cannot establish the optimal HYROX grip, rest schedule or gait, and this session does not directly measure metabolic economy.

STATION 07 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Compare early and late steps, bag control and pauses.

TEST

Adjust one feature such as pace or step length, keeping the task comparable.

MEASURE

Time, repetitions per distance, missed standards, local effort and recovery.

Task and coaching priority

The sandbag lunge station combines repeated alternating steps, lowering and rising with a load supported on the upper body. Late-race fatigue makes control, legal repetitions and pace selection especially important. Coach an athlete to cover the distance with repeatable steps and manageable pauses; an impressive opening sequence is a poor strategy if subsequent movement becomes inconsistent.

Identify what limits the athlete: the ability to support the bag, leg force, local muscular endurance, balance, breathlessness or uncertainty about the movement standard. These limitations may coexist. Compare unloaded, lightly loaded and race-load trials before assuming that restricted movement is caused by poor mobility.

Movement mechanics

During each step, the front limb accepts load and controls the lowering phase; hip and knee extensors contribute to rising and advancing. The rear limb contributes support, and the trunk manages the bag over a changing base. Position the bag securely and practice shouldering it separately before adding a long continuous sequence.

Step length changes the distance covered per repetition and the demands of lowering, rising and recovering balance. Trunk inclination also changes loading. In ten adults, Farrokhi et al. (2008) found that forward trunk inclination increased hip-extensor impulse and selected muscle activity. A model-based study of 18 adults found higher patellofemoral loading with short versus long steps at deeper knee angles (Escamilla et al., 2008). Neither establishes the safest or fastest HYROX lunge.

Use a stance width that permits balance, with controlled rear-knee contact and a stable bag. A modest forward torso angle or forward knee travel is not automatically an error. Assess whether the chosen movement satisfies the standard, remains repeatable and is tolerable for that athlete. Avoid forcing every body into a vertical shin or identical trunk angle.

Observation and coaching tests

Observation	Possible explanation	Coaching test
Athlete wobbles or adds corrective steps	Stance width, pace, load or balance demands may exceed current capacity	Repeat at lower load with slightly more lateral space between feet; compare corrections
Step length shrinks and pauses increase	Initial pace or accumulated fatigue may exceed sustainable capacity	Compare equal distances with a slower opening cadence and a planned pause
Bag shifts repeatedly or limits movement	Setup, support strategy, bag dimensions or fatigue may contribute	Rehearse the pickup and short loaded sequences before testing another long bout

Do not infer specific muscle weakness from knee movement alone. Check whether the pattern changes with load, instructions or fatigue, and ask about symptoms. Persistent pain requires assessment rather than progressively more forceful technique cues.

Progression and regression

Establish a controlled split squat, then unloaded walking lunges, then a manageable carried load. A support can help practice lowering and rising during an early regression, but it does not reproduce the race task. Develop the relevant range gradually; reducing range is a temporary training modification and must not be counted as race-standard practice.

Build loaded distance in short bouts before combining longer lunges with running. Improve one feature at a time: legal repetition consistency, bag control, distance, load or pace. Shorter steps increase the number of repetitions needed for a fixed distance, while longer steps may be harder to repeat. Compare the total cost rather than selecting either extreme on appearance alone.

Coached session example

This WPL example is a coaching starting point. After a general warm-up and unloaded rehearsal, perform four bouts of 15 m sandbag lunges at RPE 6-7 out of 10, resting 90-120 seconds between bouts. Choose a load that permits consistent movement and controlled bag handling. Film one early and one late bout from the same position.

Compare usual step length with one modest adjustment; do not alter cadence and load simultaneously. Stop the bout if the bag becomes insecure, balance repeatedly fails, standards cannot be restored after a cue, or pain appears. Once the athlete tolerates this session consistently, place a controlled 300 m run before each bout while retaining the recovery interval; this changes the task and requires reassessment.

Metrics and evidence limits

Record time, repetitions per measured distance, pause duration, missed standards, local leg effort, breathing effort and subsequent run quality. Keep bag type, load, surface and preceding work consistent. Laboratory lunge studies describe acute loading, not race outcomes, pain or injury. Select the technique that performs reliably across repeated athlete-specific trials, and recheck it when load or fatigue changes.

STATION 08 / TECHNIQUE & PERFORMANCE



Coaching illustration. Use the current rulebook to judge competition standards.

OBSERVE

Separate accuracy, squat depth, local fatigue and breathing demand.

TEST

Compare planned set sizes with the same valid total and preceding work.

MEASURE

Total time including rests, valid reps, misses and reason for stopping.

Start standing tall. After the ball rests on the ground, restart from standing; do not catch a bounce and continue directly into the next repetition. (HYROX Singles 2026/27)

Task and coaching priority

Wall balls require repeated squatting, throwing, receiving and aiming at the end of the race. The coaching problem is to preserve valid repetitions as local muscular fatigue and breathing demand accumulate. Assess the time needed to complete the prescribed valid total, including breaks and missed repetitions. An ambitious opening set can be counterproductive if it leads to repeated misses or a long recovery, while very small sets may add unnecessary interruptions. Test the athlete's strategy under representative fatigue.

Biomechanics and execution

The movement links a loaded squat with an upward throw. The hips and knees extend as the athlete rises, while the shoulders and elbows contribute to accelerating and directing the ball. The arms do more than guide it: the task requires coordinated upper- and lower-body effort. Avoid prescribing a fixed percentage of leg or arm contribution. A useful cue is “stand and send,” provided it improves the athlete's timing without encouraging excessive effort.

Choose a stance and foot angle that allow the athlete to reach the required depth consistently while maintaining balance. The knees can travel forward as part of squatting; the practical concern is whether the athlete can control the movement and repeat it comfortably. Torso inclination varies with limb proportions, stance and ball position. Judge the whole repetition rather than insisting that every athlete imitate the same body angles.

Adjust distance from the target through practice. Too close or too far can require an awkward throw or repeated repositioning, but there is no single distance appropriate for every height and release pattern. Aim at a consistent legal area of the target. Generate enough ball height to meet the requirement reliably without deliberately throwing substantially above it.

Track the returning ball and receive it under control before continuing the next repetition. Skilled athletes may coordinate the catch with their descent; beginners may benefit from a brief reset. Do not force an immediate next repetition if it causes loss of balance, rushed depth or an unpredictable throw. A regular breathing pattern is a useful practice aid, but no single inhalation-to-exhalation sequence is established as best for HYROX.

Observation and coaching test

Observation	Possible explanation	Coaching test
Throws become short late in a set	Fatigue, release timing or an overambitious set size	Compare shorter planned sets with the same total number of valid repetitions
Depth becomes inconsistent despite successful target hits	Cadence, stance, depth awareness or fatigue may contribute	Reduce cadence and use side-view feedback, then gradually restore speed
Athlete repeatedly steps or reaches to receive the ball	Inconsistent launch direction, target distance or catch timing	Mark a starting position and test a small distance adjustment at low effort

Progression and regression

Build a comfortable squat pattern, then rehearse the throw and catch with a manageable ball. A lighter ball or lower target can help teach coordination; clearly distinguish these practice conditions from competition requirements. Progress to small sets using the required load and target, increase the valid total, and then add a controlled preceding run. Strength work such as squats and presses can develop supporting capacity, while race practice remains necessary for aiming, catching and pacing.

WPL coached session example

Following a general warm-up, complete two easy sets of five repetitions. Then perform six sets of eight wall balls at RPE 6-7 out of 10, resting 45-60 seconds between sets. Use a load and target that permit accurate, controlled repetitions. Record valid repetitions and actual rest time. End the set if the catch becomes uncontrolled, depth repeatedly fails, pain develops or effort exceeds the session's purpose. Progress volume or reduce rest only when the existing session is repeatable. This is an illustrative coaching session, not a validated prescription or a requirement to train to failure.

Metrics and evidence limits

Track valid repetitions per minute, missed repetitions, set size, rest duration and the reasons for stopping. Distinguish shoulder fatigue, leg fatigue, breathlessness and accuracy problems rather than combining them into one score. The mechanics above are coaching interpretations of the task. They do not establish an optimal catch style, set structure or injury-prevention effect; compare strategies within the athlete before adopting them for racing.

Running muscle roles across the stride



The labels refer to different parts of the running cycle, not simultaneous actions in the pictured instant. This is an illustrative map of muscle locations and roles, not a measured activation image. Running studies are adjacent evidence and do not prescribe a universal HYROX gait.

Read the figure with Hamner and Delp (2013), Lenhart et al. (2014), Lai et al. (2015), and Spencer and Gastin (2001). A joint's visible motion alone cannot reveal how its muscle fascicles and tendon share the change in length.

Roxzone and running transitions

Analyze the complete transition

Separate travel, equipment setup, deliberate recovery and avoidable delay. The first two are genuine parts of the task. The third may be a useful strategy. The fourth is the coach's clearest opportunity. Treating all walking as failure can encourage an athlete to spend energy where it produces little overall benefit.

Roxzone distance and layout vary by venue, so do not build a universal extra-distance allowance into every race plan. Review the actual map and entrance and exit arrangements. In training, distinguish a station-to-run transition from ordinary running pace: mounting an ergometer, adjusting straps or lifting a sandbag adds work that a straight running split does not capture.

Plan the athlete's next action before arrival. For an erg, this means a familiar setup and monitor display. For a carry, it means identifying the correct implements and a controlled pickup. For the final station, it means choosing an initial set size and a response to a missed repetition. Rehearse these decisions without adding fatigue, then test them in a controlled combination.

A practical rehearsal

Set out a simple route with a clear entrance, equipment area and exit. Complete four easy rehearsals of approximately 20-30 seconds of travel, equipment setup, a brief station task and 20-30 seconds of running. Rest long enough to discuss one observation. The purpose is organization, not conditioning. Time the setup independently of the work and review whether a delay was necessary.

Later, incorporate the same procedure into a station session. Keep the route consistent when measuring improvement. If speed increases but equipment control worsens, reduce the demand and repeat. A quick exit is useful only after the task is complete and the athlete can move safely through the space.

Compare station and run together

The following invented example illustrates a coaching decision. It is not a benchmark or a study result. Both trials use the same station task and subsequent running distance.

Measure	Trial A	Trial B
Station time	3 min 00 s	3 min 08 s
Transition time	20 s	15 s
Following run	4 min 50 s	4 min 35 s
Combined time	8 min 10 s	7 min 58 s
Athlete effort rating	8 out of 10	7 out of 10

Trial B is 12 seconds faster overall despite its slower station split. That is a useful candidate strategy, not proof of a causal improvement from one observation. Repeat the comparison on another day, reverse the trial order and account for weather, readiness and preceding work. If the difference disappears, do not attribute it confidently to technique.

Programming technique and physical capacity

Choose the main limitation

Start with the athlete's actual bottleneck. The same slow split can require different training depending on whether the athlete lacks force capacity, repetition endurance, task familiarity or pacing control. Prioritize one or two stations during a training block while maintaining exposure to the others. Avoid adding a separate hard session for every weakness identified.

Main limitation	Primary training emphasis	Evidence of useful progress
Cannot complete the load with control	General strength and short specific exposures	More repeatable work at the same resistance
Fresh technique is inconsistent	Low-fatigue skill practice and clear feedback	Fewer corrections and more reliable repetitions
Fresh task is competent but later execution deteriorates	Gradual repetition volume and controlled preceding work	Better late-bout output without additional misses
Opening pace causes long rests	Set planning and pacing comparisons	Lower total time including rest
Station improves but running deteriorates	Combined station-run testing	Better combined performance across repeat trials

The 2026 ACSM position stand supports progressive, individualized resistance training for muscle function and physical performance. Training to failure is not consistently necessary to obtain benefits. Its broad evidence base does not establish optimal HYROX frequency, sled loads or station volumes. Use it to support planned strength development, then adjust the sport-specific work from the athlete's response. (Currier et al., 2026)

Across 43 studies, concurrent aerobic and strength training produced similar pooled gains in maximal strength and whole-muscle size to matched strength training alone. Explosive-strength gains were attenuated, particularly when both modes occurred in the same session. This supports retaining dedicated strength work while protecting power-training quality; it does not guarantee compatibility at every workload or identify an ideal HYROX schedule. (Schumann et al., 2022)

Separate learning from demanding rehearsal

Use fresh practice when the main objective is acquiring or changing a skill. Keep bouts short enough for the athlete to notice the intended adjustment. Use later practice under controlled fatigue to establish whether that skill survives the relevant task demands. Training only when exhausted makes it difficult to identify the cause of a problem and can leave insufficient high-quality practice.

For strength development, select a small number of exercises addressing the assessed need. An illustrative starting structure for a trained adult is two to four working sets of four to eight controlled repetitions for a main lift, with sufficient rest to reproduce the effort and several repetitions left in reserve. Assistance exercises and station work must fit within the athlete's existing load. These ranges are coaching examples, not a universal program or a substitute for individual assessment.

Power training uses a different objective: purposeful fast efforts with enough recovery to maintain output. Short broad-jump sets may serve that purpose when the athlete is prepared for them. Repeated burpee broad jumps performed breathless are a different exposure. Do not count every jumping circuit as equivalent to a focused power session.

Build a block with an explicit decision at each stage

Stage	Main work	Progress when
Establish control	Short fresh practice and manageable loads	The athlete repeats the task without continual correction
Develop capacity	More total work or greater load, one change at a time	Execution and recovery remain acceptable at the new demand
Integrate running	Short station-run or run-station combinations	Combined outcomes are repeatable and effort fits the plan
Rehearse the race strategy	Selected longer sequences and planned rests	The chosen approach holds under representative fatigue
Reduce fatigue before racing	Less total work while retaining familiar practice	The athlete arrives recovered and confident in the established plan

These stages are a planning framework, not fixed calendar weeks. A skilled athlete may progress rapidly in one station and need longer at another. Do not introduce unfamiliar high-volume work or a major technique change immediately before a race merely to complete the framework.

Illustrative weekly arrangement

For an athlete tolerating five training days, one possible arrangement is strength with fresh skill practice, an easy aerobic day, quality running, a second strength session and one controlled hybrid session. Place recovery days between demanding exposures where practical. Adapt the arrangement to the athlete's existing program rather than adding these sessions automatically.

Keep easy work easy. If every session becomes exhaustive, reduce overlapping station volume. Account for the combined demands of lunges, hard running and lower-body lifting when reviewing recovery.

Use effort scales consistently

RPE means rating of perceived exertion. The session examples use a simple 0-10 effort scale: 0 is rest and 10 is the athlete's maximal effort. An example target of 6-7 asks for demanding but controlled work with the ability to execute the intended task. It is not a fixed heart-rate zone or percentage of maximal oxygen uptake. Agree on the scale before using it.

Distinguish overall session effort from local grip, shoulder or leg effort. Also distinguish effort from pain. An athlete can report modest breathlessness but severe local fatigue, or a low session effort with a symptom that still requires modification. Record the limiting factor in words alongside any number.

For resistance exercises, repetitions in reserve estimate how many additional repetitions are possible with the intended technique. This is distinct from overall session effort. Record load and work completed alongside the estimate.

Assessment feedback and retesting

Establish a usable baseline

Record the athlete's goal, division, relevant training history, equipment access and current symptoms. Choose one station task that is demanding enough to reveal the limitation without requiring a full race simulation. Document the warm-up, preceding exercise, work distance, equipment, load and rest. These details make a future comparison interpretable.

Film with consent from a position that shows the feature being assessed. A side view may help with stroke sequencing; an oblique or front view can show implement clearance and foot placement. Use the same view on the retest. A two-dimensional video cannot measure every joint angle or diagnose an injury, and camera position can change the apparent movement.

Movement-screen scores should not be used as a forecast of injury. A review of 24 prospective studies found insufficient support for using the Functional Movement Screen composite score as an injury-prediction tool. Observation remains useful for selecting a task to investigate, but an asymmetry or low score does not establish a diagnosis. (Moran et al., 2017)

Give feedback the athlete can use

Describe the observation before offering an explanation: “Your final three throws were short” is more useful than immediately diagnosing weak shoulders. Ask what the athlete experienced. Then select one change and state how its success will be judged. A cue that improves appearance without helping the intended outcome may not deserve a permanent place in the athlete's routine.

In an experiment with 120 participants, an outcome-focused instruction improved standing-long-jump distance compared with an instruction focused on knee extension. The task involved rested jumps, so it does not establish better HYROX fatigue resistance or long-term skill retention. It supports trying a simple outcome cue and checking its effect. (Porter et al., 2010)

Useful trial cues include “land ready for the next rep,” “send the sled toward the far line” and “place the ball on the target.” These are coaching examples. Body-focused instruction can still be useful when the athlete needs to understand a specific action. Avoid giving a new cue on every repetition; allow enough practice to evaluate the one already chosen.

Compare like with like

Use equal workloads when comparing techniques. A lighter load or longer recovery can improve time or effort without establishing that technique caused the difference. Record changes rather than hiding them. If the goal is a race strategy, include valid repetitions, rests and transitions in the total.

Repeat small apparent improvements on a separate day. Reverse the order of alternatives when feasible and maintain comparable preceding work. Familiarization, motivation, temperature, sleep and fueling can influence the result. Without a formal reliability study, avoid presenting a one-second improvement as a precise physiological adaptation.

Monitor the cost of the program

Foster and colleagues evaluated session RPE in cycling and basketball, finding consistent relationships with heart-rate-based load estimates. Multiplying session duration by overall effort provides a practical arbitrary-unit load estimate. Record it consistently alongside the actual work and recovery reports; it is not a direct measure of tissue loading or an individual injury predictor. For example, 45 minutes at session RPE 6 gives 270 arbitrary units. (Foster et al., 2001)

Two sessions with the same calculated load may impose very different demands. Keep separate notes for running distance, loaded carries, lunge volume and jumping exposure. Review whether the athlete is adapting: expected performance, tolerable local fatigue, normal recovery and a manageable schedule matter more than chasing a steadily rising score.

Decide what happens next

Retain an adjustment when it repeatedly improves the chosen outcome, meets the task standards and remains tolerable. Continue investigating when the benefit is inconsistent or depends on conditions that will not exist in competition. Regress the task when the athlete cannot control it or recover adequately. Reassess persistent pain through the appropriate clinical route rather than repeatedly experimenting with heavier or harder trials.

At the end of a block, write one clear decision: keep the current strategy, progress one demand, change the target limitation or reduce load and reassess. This makes the next training block a response to evidence from the athlete rather than a new collection of workouts.

A four week application plan

This is a suggested review schedule, not a four-week training prescription. It specifies decisions to make, not required sessions, distances or loads. An athlete may need longer at any step. Fit practice into the existing programme, and avoid introducing major unfamiliar changes close to a race.

Week 1 Assess and agree on the question

Review the athlete's goal, current training, equipment access and recent recovery. Choose one station and one outcome. Establish a manageable baseline using the same task setup you intend to repeat. Describe what happened without immediately assigning a muscular or technical cause. Ask the athlete what limited the effort.

Ready to move on when Coach and athlete can explain the question, the repeatable task and what a useful result would look like. If the task is unfamiliar, extend familiarisation before comparing alternatives.

Week 2 Test one change

Select one cue, setup adjustment or pacing decision from the relevant chapter. Keep the work requirement and other important conditions comparable. Give the athlete time to understand the change before timing it. Record valid work, rest, effort and the athlete's feedback. Repeat a promising result on another suitable day; a single faster attempt is only a reason to investigate.

Ready to move on when The athlete can reproduce the approach with acceptable control and effort. If results are unclear, simplify the task or reconsider the explanation instead of adding more cues.

Integrate and reassess

Week 3 Check the relevant connection

Add the run-station or station-run connection that answers the original question. Use a controlled amount of preceding work when investigating execution after running; include a consistent following run when investigating station cost. Keep the integration short enough to interpret. Full-race simulation is not required to decide whether an approach merits further practice.

Ready to move on when The change remains useful in the chosen context without an unacceptable cost to the rest of the session or subsequent recovery. Otherwise, return to the simpler comparison.

Week 4 Reassess and choose the next step

Repeat the baseline task under comparable conditions. Compare the primary outcome, execution, effort and recovery; note any conditions that changed. Decide together whether to retain the approach, progress one demand, investigate another limitation or reduce the task. Record what remains uncertain and when it will be reviewed.

Finish with a decision Our next step is _____ because we observed _____. We will review it after _____ under these conditions: _____.

Two coaching decisions

The following examples are hypothetical teaching scenarios. They are not client reports, study results or performance benchmarks. Their purpose is to show how a coach can move from an observation to a testable decision.

Example 1 Wall-ball accuracy changes late in the set

An athlete completes short, fresh practice sets with valid repetitions but repeatedly misses the target late in longer sets. The athlete describes rushing to reach an ambitious set target. The visible misses do not establish weak shoulders; set size, pacing and coordination under fatigue remain possible explanations.

• Question: Would a planned set structure improve valid completion without extending total rest excessively?

• Comparison: Keep the ball, target, total valid repetitions, preceding work and setup consistent. Compare the familiar approach with a shorter planned set structure selected with the athlete.

• Record: Total time including rest, invalid repetitions, local limiting factor and the athlete's confidence in reproducing the approach.

• Decision: If the planned structure repeatedly produces a useful overall result, rehearse it. If accuracy remains inconsistent even in fresh short sets, return to setup and skill practice before increasing the work.

For this final station, do not add a following run merely because other stations use one. If the question concerns late-race execution, introduce suitable preceding work only after the fresh comparison is understandable.

Investigate the conditions before the technique

Example 2 A familiar sled load feels different

An athlete moves a familiar load continuously at one gym but repeatedly stalls at another. After watching an elite competitor, the athlete wants to copy a lower body position. Before prescribing a posture change or extra strength work, the coach checks the sled, total mass, surface, lane direction and footwear. The different settings have not created an equivalent test.

• Question: Under the current training conditions, which manageable setup allows repeatable movement and a tolerable following run?

• Comparison: Establish a suitable baseline on one lane, then test one setup adjustment while keeping resistance and other conditions unchanged. Do not compare this directly with the other gym's split.

• Record: Starts, stationary time, slipping, length time, athlete feedback and the response to a consistent following run when appropriate.

• Decision: Retain a position only when its benefit repeats. If the athlete cannot complete the task with control, reduce the demand and reassess before testing more technique changes.

The shared lesson Use anatomy and physiology to inform possible explanations. Use the athlete's task, context and response to decide what to test next.

Coach workbook

Use one workbook for one station or a defined station-run combination. This is a WPL planning aid, not a validated score or clinical assessment.

The athlete and the question

Athlete and coach

Date Division Race date

Athlete goal and current training commitments

Equipment access and relevant experience

Recovery symptoms or restrictions affecting this task

What did I observe and what did the athlete experience

Two plausible explanations and the one we will test first

Define a repeatable task

Station or station-run combination

Primary outcome and what must remain acceptable

Equipment total load or drag factor footwear and surface

Distance or valid repetitions warm-up and preceding work

Recovery following task timing boundaries and camera position

One change to test and conditions that stay the same

What counts as useful progress and what prompts stopping

Where this practice fits and what it replaces

Compare the attempts

Athlete _____ Task _____ Review date _____

Measure	Baseline	One-change trial	Repeat trial
Date and relevant conditions			
Valid work completed			
Station time, including rest			
Rest/stopped time and errors			
Transition + following run, if used			
Combined time, if relevant			
Overall effort, 0-10			
Local limiter / athlete feedback			
Later recovery / next-session effect			

Station time includes stopped time. Do not add rest twice. Mark unused fields N/A and note any change in load, distance, preceding work or recovery.

What improved and what worsened or stayed unchanged

Other possible explanations for the difference

Athlete feedback and whether the approach is repeatable

What still needs a separate-day comparison

Agree on the next action

Choose the decision that best fits the repeated observations.

- ☐ Retain the approach
- ☐ Investigate another explanation
- ☐ Progress one demand
- ☐ Reduce the task and reassess

Our reason for this decision

One practice priority

Its place in the existing programme and what changes

Next review date or condition

Measures and setup to repeat

Athlete action before the next review

The workbook is complete when it changes a coaching decision. Bring that decision and the athlete's response into the next review.

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