Fundamentals for Recovery
Practical Guide

Every hard training session triggers the same physiological cycle: **fatigue, recovery, adaptation**. Intense exercise causes short-term fatigue and impaired performance, but once the body fully recovers, beneficial changes occur and the athlete comes back fitter, faster, or stronger. This is the **adaptive response**.

Five fundamental strategies drive it, and the same five apply whether we are working with a developing athlete or an Olympic medallist: **sleep, balanced training and rest, nutrition, perspective and balance, and warm-up and cool-down**. Mastered consistently, they form the base of everything that follows.

Sleep

Sleep is the first pillar because it is the window in which the body actually does its repair work. During deep sleep, tissues rebuild, hormones supporting muscle growth are released, and the complex neuromuscular actions of a skiing or snowboarding day are consolidated into memory. Enough good sleep places the body in an **anabolic state** that builds and repairs. Too little puts it in a catabolic one, which shows up as frequent illness, emotional volatility, weight changes, and a quiet decline in performance.

Quantity and quality

- As a general baseline, athletes aged 14–17 need 8–10 hours per night, and athletes 18 and older need 7–9, with individual variation based on training load.
- Quality matters just as much as quantity.

Monitoring habits

- A simple sleep diary is often more useful than expensive apps or devices.
- Each morning, athletes record three numbers: total hours asleep, sleep quality (1–5), and how rested they feel (1–5). That pattern, tracked over weeks, surfaces problems that a single night never will.

Sleep hygiene

- Consistent bed and wake times, a cool bedroom (16–18 °C), daylight exposure during the day and blackout at night, and no caffeine within six hours of bed.
- Intense exercise, heavy meals, and sugary foods should end **at least two hours before** sleep.
- If falling asleep is a struggle, the **20-minute rule** helps: if sleep has not come after 20 minutes, get up, write down any worries, reset, and try again.

Balanced Training and Rest Cycles

Hard training only produces adaptation when paired with enough rest. A simple, well-thought-out weekly plan is, in the source language, an **absolute non-negotiable** for athletes at every level, and more important day-to-day than any complex 12-month macrocycle.

Maximising adaptation

- Rest between intense sessions is what allows athletes to perform maximally when asked to, which in turn drives the physiological adaptations that move performance forward.
- Skip the rest and the body may initially tolerate the load, but under-performance and over-reaching eventually follow.

Multi-sport youth athletes

- Sport sampling is common and useful, but it makes rest harder to protect.
- Athletes, parents, and the coaches involved need to communicate across sports and events, and organise the training week together.
- Without that coordination, recovery gaps close quickly and overtraining becomes the default.

Nutrition and Hydration

Recovery nutrition rests on four pillars: refuelling with carbohydrates, repairing with good-quality protein, protecting the immune system with fruits and vegetables, and rehydrating with enough fluid.

The approach is clear: **food first**. Whole food provides everything an athlete needs, costs less than supplements, and significantly lowers the risk of an inadvertent anti-doping violation.

Timing

- A snack combining carbohydrate and protein (milk and a banana is a good example), together with fluids, should be consumed as soon as possible after intense or prolonged exercise, followed by a full, healthy meal within two hours.

Hydration

- Losing as little as **2% of body weight** in fluids can reduce performance, slow reaction times, and blunt the adaptive response to training.
- Athletes should check morning urine colour to ensure they start every session hydrated.

Measuring fluid loss

- Weighing in underwear only before and after training gives a clean number.
- For every **1 kg** lost, the athlete should drink **1.5 L** of fluid to fully replenish.
- Fluids are most effective when taken gradually over several hours rather than all at once.
- Water works, but isotonic sports drinks containing sodium are often better because the electrolytes help the body retain what is consumed.

Maintaining Perspective and Balance

Sport can feel all-encompassing, and that is exactly why athletes need ways to step outside it. Maintaining perspective is one of the most critical things an athlete can do to recover, and it shows up in several specific habits.

An identity outside sport - Interests, commitments, and social networks beyond the athletic role give athletes somewhere to go when things are hard, and protect performance when they are not.

A sense of purpose - Understanding the deeper reasons behind the goal pays long-term dividends for both performance and health, and becomes especially valuable during setbacks.

Embracing challenge and failing smart - Outcomes are not fully controllable, so perspective means recognising that ability changes, that learning comes from effort, and that risk-taking is part of the work.

Plan, Do, Review - A simple structured reflection after training and competition (**what went well, what did not, what can be learned**) helps athletes understand their performances, monitor stress, and plan the self-care they need to stay well.

Warm-Up and Cool-Down Routines

Preparation and wind-down routines improve the session in front of the athlete and support the recovery that follows it.

Warm-up (RAMP)

- A well-designed warm-up follows the **RAMP principle**: Raise heart rate, Activate the neuromuscular system, Mobilise the joints, and Potentiate the muscles.
- There is evidence that warm-ups also enhance recovery afterwards, not only performance.

Active cool-down

- After intense training or competition, an active cool-down reduces stiffness and helps re-establish normal range of motion.
- Athletes should develop a simple way to self-assess mobility in key muscle groups, and add active flexibility work when range is reduced.

A cool-down should never be so long or strenuous that it delays the more impactful recovery steps: proper nutrition and sleep. When time is tight, ***protect the fundamentals first****.*

Secondary Interventions: Use Occasionally

Preparation and wind-down routines improve the session in front of the athlete and support the recovery that follows it.

Once the fundamentals are consistently in place, a small number of secondary strategies can be used sporadically and ideally with expert guidance. These can improve emotional state or perception of recovery and soreness, but their effects on actual muscle function recovery are unproven or questionable, and they must never disrupt or be prioritised over the fundamentals.

Cold water immersion - It can reduce perceived soreness, but effects on muscle function recovery are questionable, and there is evidence that fitness adaptations can be blunted after its use. Best reserved for intense competition phases, and only where the athlete feels it helps.

Compression garments
- It can improve the perception of recovery.
- If used, garments should be close-fitting and worn occasionally so they keep their elasticity.

Massage
- It can improve emotional state, deliver a strong placebo effect, and reduce perceived soreness.
- It is unlikely to improve muscle function directly, and if poorly timed can push into post-session nutrition or sleep.

What the Evidence Does Not Support

A number of interventions branded as recovery strategies lack the evidence to justify their use, and some carry complications, costs, or anti-doping risks that outweigh any potential benefit.

For the following methods there is little evidence to support their use: consistent use of painkillers, neuromuscular electrical stimulation, external pneumatic compression, oxygen therapy, high-dose anti-oxidant supplements, and whole-body cryotherapy.

The Adaptive Response

Balanced training and rest create the space in which adaptation actually happens.

- Targeted nutrition and proper hydration maximise the adaptive response.
- Sleep does the repair work.
- Perspective keeps the athlete well enough to keep showing up.
- Warm-up and cool-down protect the session on either side.
- Secondary interventions may nudge perception, but can also blunt the real gains if they crowd out the fundamentals.