

# Glossary of Concepts

## Technology and Monitoring

**Biometric Wearables:** Portable devices that record physiological variables (such as lactate, ECG, and sweat glucose) in real-time to evaluate sports performance [Kim 2021; Gao 2023].

**Real-Time Monitoring:** Systems that capture, transmit, and analyze biometric data instantly, allowing immediate adjustments in training [Diaz 2024].

**Non-Invasive Optical Sensors:** Optics-based technologies for measuring physiological parameters without direct contact [Gao 2023].

**Bioimpedance Sensors:** Devices that use low-intensity electrical currents to assess body composition and hydration status [P. Rodriguez 2024].

**Big Data in Sports:** Analysis of large volumes of biometric data to optimize training strategies and personalize programs [Diaz 2024].

## Training and Exercises

**Regenerative Therapies:** Advanced strategies, such as gene therapy and tissue regeneration, applied in sports injury repair [lopez2024gene].

**Muscle Electrostimulation:** Technique that uses electrical impulses to induce muscle contractions, promoting strengthening and recovery [Sanchez 2024].

**HIIT Training:** Exercise modality that alternates high-intensity periods with short rest intervals, optimizing cardiovascular capacity [hernandez2024hiit].

**Functional Training:** Routines that mimic daily movements to improve efficiency in daily activities and stability [martinez2024functional].

**Training Periodization:** Structured planning in cycles (macro, meso, and microcycles) to balance load, recovery, and prevent plateaus [martinez2024periodization].

**Physical Adaptation:** Process by which the organism adjusts and improves its performance in response to training stimuli [ramirez2024supercomp].

**Progressive Overload:** Principle of gradually increasing exercise intensity or volume to generate continuous improvements [ramirez2024supercomp].

**Supercompensation:** Recovery phase in which performance rises above the previous level following a training stimulus [ramirez2024supercomp].

**Physical Condition Assessment:** Set of tests (such as VO2 max, 1RM, flexibility tests) that determine physical state and guide training planning [J. Fernandez 2024; M. Rodriguez 2023].

**Heart Rate Monitoring:** Use of devices to record heart rate in real-time, essential for adjusting exercise intensity [R. Gomez 2024].

**Biomechanical Analysis:** Study of human movements through measuring forces and movement patterns, used to optimize techniques and prevent injuries [F. Garcia and A. Ruiz 2024].

**Biological Signal Processing:** Techniques for interpreting physiological data and converting them into useful information for training decision-making [E. Castro 2024].

**Leg Exercises:** Set of movements (squats, deadlifts, lunges, leg press) designed to enhance lower body muscles, specifically training quadriceps, hamstrings, and glutes [A. Fernandez and R. Martinez 2024; M. Rodriguez 2023].

**Upper Body Exercises:** Routines (bench press, pull-ups, barbell rows, lateral raises) that strengthen chest, back, shoulders, biceps, and triceps [A. Fernandez and R. Martinez 2024; H. Garcia and S. Ruiz 2024].

**Smart Gym Machines:** Equipment equipped with sensors and connectivity that provides real-time feedback to adjust loads and techniques, facilitating personalized routines [F. Martinez and L. Gomez 2024; Hernandez 2024].

#### **Muscle Groups:**

- **Quadriceps:** Primarily trained with squats, leg press, and lunges.
- **Hamstrings:** Stimulated through deadlifts, leg curls, and lunges.
- **Glutes:** Strengthened through squats, hip thrusts, and deadlifts.
- **Chest:** Worked with bench press, push-ups, and pec deck.
- **Back:** Activated with pull-ups, barbell rows, and pulldowns.
- **Shoulders:** Exercised with military press, lateral raises, and face pulls.
- **Biceps:** Developed through barbell and dumbbell curls.
- **Triceps:** Strengthened through dips, extensions, and bench press.

**Personalized Gym Routine:** Training programs adapted to individual needs and goals, based on biometric data analysis and personal preferences [Ramirez and L. Torres 2024; V. Castro and Mendoza 2024].

## **Physiotherapy and Rehabilitation**

**Sports Physiotherapy:** Health area that integrates rehabilitation techniques and injury prevention in athletes through therapeutic exercises and physical modalities [Gonzalez and Silva 2024; Lopez and Vega 2024].

**Manual Therapy:** Set of physical manipulation techniques performed by physiotherapists to relieve muscle tension and improve joint mobility [Gonzalez and Silva 2024].

**Electrotherapy:** Use of electrical currents (TENS, EMS) to reduce pain and stimulate muscle recovery [Sanchez 2024; M. Torres 2024].

**Rehabilitation Modalities:** Application of ultrasound, laser, and electrotherapy in post-injury recovery [M. Torres 2024].

## Planning and Periodization

**Training Objectives:** Specific goals (hypertrophy, fat loss, strength, endurance) that determine the exercise program structure and require different implementation strategies [Ramirez and L. Torres 2024; V. Castro and Mendoza 2024].

**Periodization Principles:** Systematic organization of training in phases (preparation, competition, transition) to optimize results and prevent stagnation, based on scientific principles of physiological adaptation [martinez2024periodization; ramirez2024supercomp].

### Training Variables:

- **Volume:** Total amount of work (sets x reps x weight), fundamental for hypertrophy.
- **Intensity:** Load percentage relative to maximum (1RM), key for strength development.
- **Frequency:** Number of sessions per muscle group/week, based on recovery capacity.
- **Density:** Relationship between work and rest, crucial for metabolic adaptations.
- **Tempo:** Movement execution speed, important for specific objectives.

### Progression Methods:

- **Linear Progression:** Gradual and constant increase in loads [martinez2024periodization].
- **Undulating Periodization:** Cyclical variation of volume and intensity to optimize adaptations.
- **Deload:** Planned periods of load reduction to prevent overtraining.
- **Autoregulation:** Adjustments based on daily performance and biofeedback [F. Garcia and A. Ruiz 2024].

**Personalization Factors:** Key elements for adapting routines including experience level, time availability, physical limitations, genetics, injury history, and personal preferences [V. Castro and Mendoza 2024; Ramirez and L. Torres 2024].

## Metrics and Tracking

**Progress Indicators:** Objective measurements including:

- **Strength:** 1RM tests and performance in key exercises.
- **Body Composition:** Measurements of muscle mass and body fat.
- **Endurance:** Cardiovascular capacity and muscular endurance.
- **Mobility:** Range of motion and flexibility.

[J. Fernandez 2024; P. Rodriguez 2024]

**Biofeedback:** Body signals (fatigue, pain, recovery, sleep quality, appetite) that guide programming adjustments [F. Garcia and A. Ruiz 2024; R. Gomez 2024].

**Tracking Systems:** Digital tools and wearables to record and analyze:

- **Training Metrics:** Volume, intensity, progression.
- **Biometric Data:** Heart rate, heart rate variability, sleep patterns.
- **Trend Analysis:** Progress and stagnation patterns.

[Diaz 2024; Kim 2021]

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