

Ministry of Higher Education and Scientific Research Institute of Science and Techniques of Physical and Sports Activities Mohamed Khider University - Biskra



Courses in :

# Introduction to the Field of Science and

# **Techniques of Physical and Sports Activities**

# For First-Year Students (Common Core)

## 1<sup>st</sup> Year LMD

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Academic Year : 2023/2024

### **General Information about the Course:**

- Unit Title: Exploratory Learning Unit
- **Course Title:** Introduction to the Field of Physical and Sports Activity Sciences and Techniques
- Type of Lesson:
  - Directed Work
  - Cours
  - Semester-based
  - o Annual
- **Coefficient:** 01
- **Credit:** 01
- **Duration:**  $(14\times2)$  28 weeks with a total of  $(21\times2)$  42 hours
- Target Audience: First-year Bachelor's students (Common Core)

### Learning Objectives:

- Acquiring fundamental principles, theoretical, and practical knowledge.
- Enhancing students' physical and technical levels in the field.

### **Prerequisite Knowledge:**

- Understanding the basic principles of the specialization and its applications in the sports field.
- Familiarity with theories and different training methods.

### **Assessment Method:**

• Continuous assessment and final exam.

### **Evaluation of Learning:**

- A written exam at the end of the semester, covering all discussed topics in lectures.
- The assessment includes questions on analysis, synthesis, comprehension, and inference.

### **Instructor Information:**

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- **Cours Schedule:** Tuesday, 11:10 12:40
- Academic Year: 2024/2025

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# **First Semester Courses**

### **Cours 1: Conceptual Introduction to Educational Physical and Sports Activity**

### Introduction

Sports activities are among the most important means of self-expression for students or individuals, both inside and outside the school environment. Through sports, individuals express their desires, inclinations, and talents through play, which contributes to their holistic development—physically, physiologically, and psychologically—ultimately enhancing both their physical and mental performance.

In its modern educational form, physical activity, with its structured systems, sound principles, and diverse applications, has become a significant field within education. It plays a crucial role in preparing responsible citizens by equipping them with broad experiences and skills that enable them to adapt to their society. This adaptability helps individuals shape their lives and supports their continuous growth and development.

Despite this, there remains a widespread misconception about physical education and its objectives. Many perceive it merely as a form of play, entertainment, or leisure, while others consider it an unnecessary addition to the school schedule—a mere break between academic lessons. However, in reality, **physical education and sports activities** refer to structured human movement in an educational and developmental setting. When taught at a basic educational level in schools, it is referred to as **physical education and sports**, whereas in a competitive context among individuals and groups, it is termed **sports**.

### **Objectives of Sports Activities**

Among the key objectives of sports activities are:

- Enhancing an individual's ability to focus, pay attention, perceive, observe, grow, and innovate.
- Improving the efficiency of vital body systems, such as the cardiovascular and respiratory systems, by strengthening the heart and lungs, thereby increasing their functional capacity.
- Promoting overall physical health and well-being.
- Developing physical fitness and maintaining proper posture.
- Achieving social and psychological adaptation within one's family and community.
- Instilling desirable social values and attitudes.

### **Types of Sports Activities**

### From a Social Perspective:

- 1. **Individual Sports:** These are activities performed by an individual without the assistance of others. Examples include:
  - Running
  - Boxing
  - Horseback riding
  - Swimming
- 2. **Team Sports:** These involve participation within a group, often referred to as team sports. Examples include:
  - Football (Soccer)
  - Basketball
  - Handball

### **Based on Performance Method:**

- 1. **Calm Games:** These activities require minimal physical effort and are usually played in a quiet atmosphere with family or friends in a confined space, such as an indoor games hall.
- 2. **Simple Games:** These are characterized by their simplicity, as they lack complex details and numerous rules. They often include songs and stories accompanied by basic movements, making them suitable for children.
- 3. **Competitive Games:** These require skill, muscular and nervous coordination, and physical effort appropriate to the type of game. Individuals can compete either individually or in teams.

### The Concept of Physical Sports Activity

The term physical sports activity refers to any bodily movement that results in energy expenditure, such as running and various forms of play. Physical sports activity extends beyond mere bodily movement to encompass cognitive awareness, emotions, sensations, reactions, and personal motivations. This broad definition illustrates that the concept of physical education has evolved beyond being solely about muscles and the body, as previously understood, to include all aspects of an individual's healthy and holistic development, contributing to the formation of a well-rounded personality in society.

### **Specific Objectives of Physical Sports Activity**

As an integral part of general education, physical sports activity aims to achieve various objectives, including health, educational, instructional, and behavioral goals.

#### **Health Objectives:**

These objectives focus on maintaining, improving, and strengthening overall health. The health goal involves researching the principles that govern physical sports activity to enhance health, support physical growth, and establish health guidelines for different stages of development. Sports activities, when based on sound educational principles and health instructions, contribute to the development of organs, muscles, and physiological systems such as the cardiovascular, respiratory, endocrine, and digestive systems. Additionally, they enhance the daily productivity of the central nervous system, improving functions like thinking, observation, attention, memory, and movement coordination.

The health objectives of physical sports activity include:

- Promoting balanced physical development and strengthening internal organs.
- Instilling proper lifestyle habits in students.
- Teaching students basic health habits and first aid principles.

### **Educational Objectives:**

This aspect focuses on the comprehensive education of an individual—intellectually, morally, and physically—by linking education with learning. The educational goals of physical sports activity aim to:

- Develop students' enthusiasm for sports and activities that enhance their sense of coordination and rhythm in movements and exercises.
- Instill courage, teamwork, responsibility, and a love for discipline and order.
- Encourage an optimistic balance between work and training.
- Foster independent physical activity and optimal use of educational and psychological knowledge.

• Enhance observation skills, critical thinking, creativity, and social interaction.

### **Instructional Objectives:**

The instructional goal of physical sports activity is to teach movement skills, exercises, and techniques. It aims to:

- Develop motor skills in a natural and structured manner, emphasizing essential movement skills necessary for daily life.
- Provide students with sports-related knowledge and experiences to ensure personal well-being.
- Encourage the learning and retention of movement skills, recognizing the importance of motivation and psychological readiness.
- Studies show that students and athletes entering this stage exhibit significant neurological development, which contributes to enhanced sports skills due to their innate enthusiasm for movement.

### **Behavioral Objectives:**

These objectives focus on the learner's behavior and represent the ultimate outcome of education. If the goal is to reduce violence in school environments, alleviate psychological stress, manage excess energy, and enhance social adaptation through physical sports activity, then achieving this goal requires consideration of real-world conditions, including material and human resources. The aim is to develop psychologically, emotionally, and physically healthy individuals who are responsible and socially well-adjusted.

### **Cours 2: The Concept of Educational Physical Sports Activity**

### The Concept of Educational Physical Sports Activity

Educational physical sports activity, also known as physical education and sports in the educational field, is not a product of chance. Rather, it plays a significant role in a child's life, contributing to their overall development. It does not solely focus on physical growth but extends to cognitive, intellectual, emotional, and social aspects through organized sports activities.

### Definition

Physical education and sports is a fundamental educational subject that contributes to academic integration. It is also conducted as extracurricular activities (either indoors or outdoors), and its outcomes can be assessed at the behavioral, motor, cognitive, and emotional levels.

### **Definition According to the Educational Curriculum**

- Physical education and sports (or educational physical sports activity) is an academic subject governed by the legislative framework of the Algerian school system, aiming to prepare students to face various situations in school and daily life.
- It consists of pedagogical processes with educational dimensions that influence a student's psychological, motor, emotional, and cognitive development. This is achieved through physical sports activities and structured games with established rules.
- It serves as an educational tool rather than a purely athletic objective, fostering the development of a student's cognitive, motor, social, and emotional behaviors. Additionally, it actively contributes to enhancing the student's overall competencies throughout their learning journey, requiring thoughtful planning aligned with real-world conditions and available resources.

### The Relationship Between Physical Education and General Education

In its modern educational form, educational physical sports activity is an integral part of general education. It helps prepare individuals with the skills necessary to adapt to society, shape their academic and professional lives, and contribute to their nation's development.

### As Abbas Ahmed Saleh states:

"Physical education and sports, like other academic subjects, serve as an educational tool within the school environment. Engaging in sports activities in schools is primarily based on educational principles that focus on psychological, social, and cognitive aspects."

### **Educational Physical Sports Activity in Algeria**

### Definition

Physical education and sports in Algeria are considered an integral part of the national education system, deeply embedded within the broader educational framework. It follows the same goals and objectives as general education, aiming to enhance individual capabilities and develop productive and efficient citizens through organized physical education and sports programs.

It is expected to fulfill three main functions:

- 1. **Physical Aspect**: Enhancing **physiological**, **psychological**, **and motor skills** of practitioners by improving **body control and adaptation to the environment**.
- 2. Economic Aspect: Improving an individual's health and psychological stability increases their resistance to fatigue, allowing them to optimize their energy usage at work, which ultimately boosts both individual and collective productivity.
- 3. Social Aspect: Engaging in physical and sports activities instills cultural and moral values, equipping individuals to handle daily challenges while fostering civil harmony. It also promotes communication, cooperation, responsibility, and civic awareness, helping to reduce tensions that may cause conflicts between individuals or groups.

The democratization of physical education and sports is also a powerful tool for women's empowerment and advancement. Furthermore, it plays a vital role in mobilizing society to defend and uphold its achievements.

### Cours 3: Objectives of Educational Physical Sports Activity According to Educational Curricula (Continued)

### **Objectives of Physical Sports Activity According to the Educational Curriculum**

As an educational subject, physical education and sports (P.E.S) aims to reinforce motor skills, psychological behaviors, and social attitudes through diverse physical and sports activities that contribute to shaping and refining the student's personality in the following aspects:

### **1. Physical Aspects**

- 1. Developing and improving physical attributes (speed, endurance, strength, agility, flexibility, etc.).
- 2. Enhancing physiological performance (cardiorespiratory system, muscular system, glandular system).
- 3. Regulating and managing physical effort effectively.
- 4. Optimizing energy resources utilization.
- 5. Achieving better coordination of movements and actions.
- 6. Maintaining balance, improving physical output, and enhancing sports performance.

### 2. Cognitive Aspects

- Understanding human body composition (anatomy) and the effects of physical exertion.
- Learning about biomechanical laws affecting the human body.
- Acquiring knowledge of first aid principles for on-field incidents.
- Understanding health and safety precautions, such as warm-up techniques.
- Developing verbal and non-verbal communication skills.
- Learning rules and history of sports, both nationally and internationally.

### 3. Social Aspects

- Embracing sportsmanship and accepting both victory and defeat gracefully.
- Cultivating a sense of responsibility and constructive initiative.

- Developing acceptance and interaction with others within the boundaries of sports regulations (opponents, teammates, or female participants).
- Learning self-control and emotional regulation in competitive environments.

### **Cours 4: Classification and Categorization of Educational Physical Sports Activities**

### **Classification or Categorization of Sports Activities**

Experts have classified sports activities based on various perspectives, considering their objectives, number of participants, type, role, and nature. These classifications include:

### **Physical Education and Sports Lessons (P.E. Class)**

Physical education (P.E.) lessons are a form of academic subject, similar to natural sciences, chemistry, and languages. However, P.E. differs as it not only develops students' motor skills and experiences but also provides essential knowledge related to health, psychology, and social aspects, alongside scientific information on human body composition.

At the school level, P.E. ensures the holistic development of students, catering to their physical needs according to their age and progressing motor abilities. Additionally, it offers opportunities for adolescents to engage in competitive activities within and outside the school (various sports activities). Essentially, P.E. lessons consist of educational situations = sports exercises.

### Structure of a Physical Education and Sports Lesson

Perspectives on structuring a P.E. lesson vary across different educational systems, such as the Soviet school, Eastern European countries, and Arab nations. In Algeria, the development of P.E. lessons has evolved from objective-based learning to competency-based learning. The structure of a P.E. lesson includes the following stages:

### A – Warm-up / Preparatory Phase (Preparation Stage):

- General preparation of students at the psychological and physical levels (presenting procedural objectives and general warm-up).
- Specific preparation related to the targeted activity and set objectives (focusing on warming up the specific muscle group intended for the activity).

### **B** – Main Phase (Learning Stage for Individual or Team Activities):

- Educational situations aimed at achieving the set objectives.
- Practical application to assess the level of success in achieving the objectives.

### C – Cool-down / Conclusion Phase (Evaluation Stage):

• Full recovery and relaxation.

• Group discussion, including the announcement and discussion of results.

### **Teacher's Responsibilities**

The teacher holds full responsibility towards students, not only in organizing activities but also in:

• Supervising students at the beginning and end of the session (monitoring attire, ensuring hygiene, and managing the allocated class time effectively).

(Ministry of National Education, 1996, pp. 16-17).

### **Classification of Activities in Physical Education Lessons**

### A. Classroom Activities

These are activities conducted within the P.E. lesson to achieve the desired educational objectives.

### **B.** Extracurricular Activities

Extracurricular activities serve as a complementary part of the P.E. program in schools, aiming to fulfill the same objectives. They are categorized into:

### 1. Internal Extracurricular Activities

These activities are conducted outside of school hours but within the school premises. Their purpose is to provide every student with the opportunity to practice their preferred activity and apply the skills learned during lessons. These activities are closely linked to P.E. lessons, forming the basis for internal activity planning. The nature of these activities varies from one school to another, depending on the available resources, both individual and collective.

Internal activities typically take place during long and short school breaks, under the supervision of teachers and outstanding students, who benefit from the opportunity to learn sports management and officiating. Examples of internal extracurricular activities include:

- Organizing sports tournaments between different school sections across various activities.
- Hosting festivals and celebrations on special occasions and school sports days.
- Promoting sports awareness among students through wall magazines, articles, and participation in projects sponsored by the Ministry of Education.

### **Importance of Internal Extracurricular Activities**

The main goal is to enable every student to engage in multiple aspects of their sports interests. These activities complement the school's P.E. program, helping students achieve educational objectives in a structured and responsible manner.

### **Objectives of Internal Extracurricular Activities**

- Achieve the goals of the P.E. curriculum.
- Improve students' performance in various sports activities.
- Strengthen cooperation and friendship within the school community.
- Identify and nurture sporting talents among students.
- Understand students' interests and preferences to tailor activity programs accordingly.
- Develop sports leadership skills and utilize students' free time effectively.
- Enhance physical and motor abilities.
- Promote ethical values through sports.

### **Teacher's Responsibilities in Internal Extracurricular Activities**

- Scheduling competitions and matches in a visible location within the school.
- Selecting activities that align with students' interests, abilities, and characteristics.
- Involving students and school staff (administration) in planning, organizing, and implementing activity programs.
- Ensuring that activities match the school's material resources.
- Designing extracurricular programs that complement the daily P.E. curriculum.

### Cours 5: Classification and Division of Educational Physical and Sports Activities (Continued)

### 2. External Extracurricular Activities

External extracurricular activities complement P.E. lessons and internal extracurricular programs to reinforce the school's P.E. curriculum. These activities are designed for outstanding athletes within the school and are therefore competitive. Their programs are organized under the supervision of P.E. directors, sports federations, and educational authorities, alongside an annual plan set by the school's P.E. teacher. This plan includes matches and competitions against other teams, ensuring they do not interfere with the official school sports schedule.

External extracurricular activities refer to activities conducted outside the school but organized and supervised by the school. Unlike internal activities, they are not restricted by the school's timetable. While internal extracurricular activities serve as an extension of P.E. lessons, external activities extend internal extracurricular programs by allowing talented students to focus on their preferred sport or event. These activities include sports days, interschool competitions, promotional sports events, trips, volunteer work, and other school-supervised activities.

External extracurricular activities provide talented students in basketball, athletics, swimming, football, and other sports with the opportunity to form school teams that compete against teams from other schools.

From the above, it is clear that P.E. lessons, internal extracurricular activities, and external extracurricular activities form an interconnected unit aimed at developing various student aspects, including health, physical fitness, skill development, tactical awareness, cognitive abilities, psychological well-being, and social skills—all key objectives of the P.E. curriculum.

### Principles of Organizing External Extracurricular Activities

To ensure effective organization, teachers should consider the following:

- Selecting sports teams based on students' age groups, as different activities require specific physical attributes and skills.
- Choosing team leaders with good moral character and appropriate performance levels.

- Scheduling training sessions that do not interfere with academic performance.
- Providing the necessary resources for successful activity execution.
- Forming teams in various sports disciplines instead of focusing on a single activity.
- Offering awards for the best team and the most sportsmanlike player.

### **Objectives of External Extracurricular Activities**

- Providing talented students with opportunities to represent their school in regional or national competitions.
- Helping students enhance their abilities and talents.
- Assisting students in achieving sports excellence and joining sports clubs.

### Difference Between Internal and External Extracurricular Activities

Internal Extracurricular Activities	External Extracurricular Activities
Conducted within the school.	Conducted outside the school.
Available to all students.	Available to elite students only.
Includes competitions and matches between	Includes competitions between different
school sections.	educational institutions.
Complements P.E. lessons.	Complements internal extracurricular
	activities.
Follows the school timetable.	Not restricted by the school timetable.

Cours 6: Principles of Movement Learning in Educational Physical and Sports Activities (Continued)

### **Principles of Movement Learning in Physical and Sports Activities**

### 1. Mechanism of Motor Learning

The study of motor learning mechanisms is based on research findings in the following fields:

- Information organization and calibration research.
- Feedback research.
- Cognitive guidance research.

These studies focus on collecting, processing, transmitting information, and making decisions. While we can observe pre-performance actions, the performance itself, and its outcomes, the actual learning process remains unseen. Before diving into the complexities of this process, it is important to define key concepts related to these three observable and analyzable events.

Motor learning requires three essential mechanisms:

- 1. Reception Mechanism (Stimulation): Also referred to as input.
- 2. Response Mechanism: Also referred to as output.
- 3. Transmission Mechanism: This serves as the link between the reception and response mechanisms.



Illustrative Diagram of the Motor Learning Mechanism

Detailed Explanation of the Mechanisms

### 1. Reception Mechanism

Information is transmitted from both external and internal stimuli through sensory organs, which act as receptors. The sensory organs that receive stimulation and initiate responses in living organisms are highly specialized, each being sensitive to a specific type of stimulus. There are different types of receptors, categorized based on their location:

- External Receptors: These receive stimuli from outside the body and include retinal cells in the eye (about 120 million sensory cells in the retina), as well as parts of the ear responsible for hearing and the skin for touch.
- Internal Receptors: These receive stimuli from internal organs, blood vessels, and the lungs.
- **Proprioceptors (Self-Receptors):** These are mainly found in muscles, tendons, and joints, and are commonly referred to as kinesthetic sense receptors. They also include receptors in the inner ear (vestibule), which work together to provide information about body position and movement, assisting in balance maintenance. The semicircular canals in the inner ear are the primary internal receptors for rotational movements, making the proprioceptive system essential in determining body posture and movement.

**For example:** A gymnast performing an aerial somersault relies on proprioceptive feedback to perceive the position of different body parts in the air and their relation to the apparatus (vault, mat, or water surface during a dive).

### 2. Response Mechanism

The response mechanism involves muscles and glands, which execute motor actions. There are three types of muscles:

- 1. **Striated (Skeletal) Muscles:** These muscles contract rapidly and are responsible for moving limbs and the body by exerting force on various skeletal levers.
- 2. **Smooth Muscles:** Found in internal organs, their responses are involuntary, slow, and rhythmic.
- 3. **Cardiac Muscle:** Contracts faster than smooth muscles and is essential for heart function.

When a muscle fiber is stimulated, it contracts to its maximum potential, provided the stimulus is strong enough. This principle is known as the "all-or-nothing law."

The strength of muscle contraction depends on the number of stimulated muscle fibers, which release chemical substances that influence body functions. Among the most notable glands involved in physical performance is the adrenal gland, which releases adrenaline into the bloodstream. This hormone increases activity levels, especially in response to stress or emergency situations.

### 3. Transmission Mechanism

All sensory organs are connected to nerve fibers (neurons), which carry signals to and from the central nervous system (CNS).

- Sensory neurons (afferent fibers): Carry information from sensory organs to the CNS, which consists of the spinal cord and brain (cerebellum).
- Motor neurons (efferent fibers): Transmit commands from the CNS to muscles and glands to generate a response.

If a stimulus is too weak, it may not be sufficient to activate a muscle fiber. However, if the stimulus is strong enough, the nerve fiber transmits a signal, prompting the muscle to contract at full capacity at that moment.

Nerve impulses (neural signals) travel from sensory neurons to motor neurons through the central nervous system. The CNS processes these signals, ensuring appropriate responses by coordinating ascending sensory pathways (from sensory organs to the CNS) and descending motor pathways (from the CNS to the muscles and glands).

### **Cours 7: Theories of Motor Learning in Physical Educational Activity**

### **Theories of Motor Learning:**

From the previously explained learning mechanisms, it becomes clear that learning is an internal neurological process that is assumed to occur when a change in performance takes place. This indicates that learning is always a progression toward improvement. Psychologists have proposed three fundamental theories to explain how humans acquire a particular skill or learn its movement:

- Classical Conditioning Theories
- Trial and Error Learning Theory
- Insight Learning Theory

### **A. Classical Conditioning Theory**

In this theory, the scientist Pavlov explains the learning process physiologically, based on forming a neurological connection between a stimulus and a response. However, the connection is not formed between the original stimulus and its natural response but rather between another stimulus (a conditioned stimulus) that has been associated with the original stimulus. Over time, the conditioned stimulus alone becomes sufficient to elicit the response that was originally triggered by the primary stimulus (e.g., food).

Pavlov identified several key factors necessary for this type of learning to occur:

- The original (natural) stimulus and the conditioned stimulus (e.g., a bell) must appear together in close succession, with a very short interval between them.
- Repeated association of the natural stimulus with the conditioned stimulus.
- The absence of strong external stimuli that may divert attention during the association process.
- The conditioned stimulus should not have a higher biological significance than the natural stimulus.

### **B.** Trial and Error Learning Theory

Thorndike proposed that learning in both humans and animals occurs through attempts and mistakes. In response to various situations, an organism engages in multiple incorrect attempts before achieving the expected response. Several important conditions must be met for this type of learning to take place:

- The individual must engage in an activity triggered by a specific need.
- There must be an obstacle preventing the individual from reaching their goal.
- The individual must attempt multiple solutions.
- The person will make both incorrect and correct responses before eventually reaching the correct movement or response.

### **C. Insight Learning Theory**

This theory was developed by German psychologists such as Kohler, Koffka, and Wertheimer. It suggests that learning and achieving a goal occur suddenly after a period of hesitation, through observation, relationship recognition, or holistic perception. The Gestalt school referred to this type of learning as "Einsicht", meaning insight or understanding.

# How Do Learning Theories Contribute to Understanding and Acquiring Motor Skills in Physical Education?

Insight learning plays a crucial role in sports, such as football (soccer). To execute a movement or skill correctly and effectively, a player must maintain continuous awareness of external conditions, such as reading an opponent's movements and timing their reception of the ball for a successful dribble.

The Classical Conditioning Theory emphasizes the importance of repetition in reinforcing and stabilizing movement skills. This theory also highlights the role of the conditioned stimulus (e.g., the bell) in triggering an appropriate response, providing insight into the impact of moral or material incentives in achieving the correct response (reaction).

Meanwhile, the Trial and Error Theory is invaluable for complex movements that require multiple attempts. Some motor skills are initially performed incorrectly, requiring adjustments and repeated practice until the correct movement or response is mastered.

### Cours 8: Problems and Challenges Facing Physical Education and Motor Activities in Educational Physical Activity (Continued)

### Problems and Challenges Facing Physical Education (P.E.) Classes:

Zeigler believes that in the field of physical education, we carry one of the darkest images within the entire educational system. This image remains undefined and persists due to the immense confusion and disorder we face, both individually and collectively, in the field. As a result, prevailing educational attitudes are mostly skeptical about the ability of physical education to achieve academic educational goals. This skepticism has led to wellknown negative outcomes, such as the lack of funding for sports activities and facilities, the repurposing of playground spaces for classroom construction, and the reassignment of physical education periods to subjects deemed more important. Physical education remains a non-essential subject in the curriculum, often limited to just one session per week in most middle and high schools, which has contributed to the spread of misconceptions and misunderstandings.

Nelson and Bronson pointed out that physical education teachers, at the beginning of their professional careers in schools, face numerous challenges that they must recognize, understand, analyze, and work to resolve. Zeigler adds that the responsibility for taking the first step in addressing these issues falls on officials in colleges, institutes, and departments of physical education and sports. They must support and resolve most of these problems by presenting, studying, and proposing suitable solutions through research forums, discussions, and serious scientific conferences. (Ameen Anwar Al-Khouli et al., 1998, pp. 65-67).

### Problems That Have Prevented the Implementation of the Physical Education Curriculum and the Activation of School Clubs (Lebanese Experience):

The practice of physical education and sports is a fundamental right for all and should be guaranteed within the educational system and other areas of social life. This principle was affirmed by the International Charter of Physical Education and Sport in Paris, issued by the International Organization for Education, Science, and Culture. It also emphasized that physical education and sports constitute an essential element of sustainable education within the comprehensive educational system, which must allocate the necessary space and importance to ensure balance and strengthen the connections between physical activities and other educational components. This prompts us to question the challenges faced by school principals and physical education teachers that have hindered the implementation and realization of its project. Accordingly, the Lebanese Educational Center for Research and Development conducted a field study through research carried out by the Department of Physical Education and Extracurricular Activities, in collaboration with the expert in school sports, Mr. Ahmed Helmi Al-Nawal, on the organization and development of school sports. The study aimed to identify:

- 1. The problems that have prevented the implementation of the physical education curriculum and the activation of school clubs.
- The requirements for implementing the physical education curriculum and the teacher's guides prepared by the Educational Center, as well as the requirements for activating school clubs.
- 3. The reasons behind the reluctance of many schools and students to participate in school championships and the reasons why elementary school students and institutions do not participate in tournaments and sports competitions like their counterparts in high schools.
- 4. Suitable solutions to the presented issues, taking into account the opinions of school principals and teachers.

In the first phase, questionnaires were sent to a sample of teachers, with approximately 600 teachers completing them. The second phase expanded the study to a comprehensive level. In addition to the research conducted by Mr. Ahmed Helmi Al-Nawal, the study focused on the following aspects:

- 1. The physical education curriculum, especially since it is the first one prepared by the Ministry of Education and Higher Education based on the educational reform plan and the new educational structure in Lebanon.
- 2. The conditions of the teaching staff specializing in physical education, their locations, and whether the surplus of staff in some schools is one of the main issues preventing the activation of their role and increasing their productivity.
- 3. Whether the required training courses are a key factor in advancing this field.
- 4. The availability of sports fields and facilities within schools or in neighboring schools to establish training centers for the required sports.

- 5. Whether the system for organizing school sports championships discourages many schools from participating due to its reliance on elite students.
- 6. The role and effectiveness of educational sports media, which serves as an awareness and educational tool to correct widespread misconceptions about physical education and sports. It also plays a key role in preparing and motivating students to strive for better performance.
- 7. The regulations and laws governing physical education, the teaching staff, and school sports activities are outdated and would benefit from modifications to align with modern concepts and current developments.

In light of the findings of the study and interviews with some teachers who worked in schools, as well as with successive administrations responsible for overseeing school sports, the difficulties facing the progress of physical education in schools can be summarized as follows:

**First:** A significant number of schools lack physical education teachers, while many existing teachers have a weekly workload of fewer than nine sessions.

**Second:** There is a need for comprehensive retraining to keep up with developments in physical education concepts and methodologies. It is worth noting that the Educational Center for Research and Development has trained 650 new teachers based on modern physical education curriculum concepts through teacher training programs in six training and education centers.

**Third:** About 35% of the teachers surveyed have not implemented the curriculum and teacher's guide issued by the Educational Center for Research and Development, despite schools being informed about them more than three years ago.

**Fourth:** The decision to establish school clubs was one of the key measures taken by the Ministry of Education and Higher Education, through the Educational Center for Research and Development, to promote youth and sports activities within the educational reform plan. These clubs are intended to complement the curriculum, enhance students' skills, meet their educational needs, and provide constructive extracurricular activities. However, this decision has not been seriously followed up on, despite being issued three years ago.

Fifth: School participation in ministry-organized sports activities (school championships) is restricted to a limited group of athletically gifted students, usually from high schools or the

final grades of middle school. As a result, elementary school students and the majority of middle school students are deprived of participation in sports activities.

**Sixth:** A large number of schools lack sports fields, which not only hinders physical education classes but also prevents any form of sports activities. Additionally, the shortage of sports equipment and tools makes physical education classes dull and unengaging, reducing their overall effectiveness.

**Seventh:** Following the issuance of Law No. 247 on July 8, 2000, which established the Ministry of Youth and Sports and placed the General Directorate of Youth and Sports under its jurisdiction while transferring physical education teachers to the General Directorate of Education, school sports became the responsibility of the Ministry of Education and Higher Education. The ministry prepared a draft decree to establish a department responsible for physical education, sports, and scouting in schools. It also issued a decision to create a sports unit within the ministry, whose role was limited to organizing school sports tournaments and providing opinions on sports-related matters referred to the ministry. However, this unit was given no authority for overseeing or monitoring physical education in schools.

Thus, school sports have remained for three years without a technical and administrative reference related to the nature of this profession.

In light of the aforementioned difficulties facing school physical education, several proposals have been put forward to overcome these challenges, as follows:

**First:** Following up on the draft decree regarding the establishment of an administrative body within the Ministry of Education and Higher Education to oversee school physical education, scouting, and youth affairs in public schools.

**Second:** Forming a permanent high committee to supervise school sports, with the primary mission of supporting, encouraging, and promoting physical education in both public and private educational institutions. This high committee would be represented in each educational district by a regional committee called the "Regional Committee for School Sports Activities."

**Third:** Organizing school physical education requires issuing an administrative decision mandating schools to adhere to the following:

 Considering physical education as a core subject in the curriculum and ensuring that its sessions are not canceled for any reason.

- Distributing the teacher's workload evenly throughout the week.
- Ensuring that no more than one class occupies the sports field at the same time.

**Fourth:** Introducing the position of "Senior Teacher" as a moral incentive for highly skilled teachers.

**Fifth:** Establishing training centers in school clubs that have equipped sports fields or are located near such facilities, and assigning qualified teachers to train in one or more sports at these centers.

**Sixth:** Reviewing certain provisions of the internal regulations for physical education teachers to align with new conditions and developments.

**Seventh:** Preparing a project to establish a specialized educational body responsible for monitoring and guiding physical education teachers in public schools.

**Eighth:** Adding one or more representatives from municipal councils in both the capital and Mount Lebanon Governorate to the High Committee for School Sports. Additionally, including a representative from the municipal council in the Regional Committee for School Sports Activities in other regions, thereby strengthening collaboration with municipalities in the field of sports facilities.

**Ninth:** Establishing a quarterly magazine dedicated to sports awareness and education, featuring contributions from physical education teachers, educators, and educational journalists. This magazine would highlight school sports activities in daily newspapers and introduce special awards for outstanding athletes, to be distributed at the same time as awards for academic excellence. (*Nizar Gharib*, 2025)

### **Teacher's Duties Toward the School Community:**

We can pose the following question: To what extent is the physical education class in our schools considered necessary, mandatory, and important in the broadest sense of the term?

It is widely observed that physical education classes are regarded as secondary by many school principals, teachers of other subjects, and even students themselves. In their view, these classes can be dispensed with, especially towards the end of the academic year, as students prepare for exams—particularly those in critical grade levels. A significant part of this neglect and lack of appreciation for the subject is evident in the fact that physical education classes do not influence a student's success or failure.

Therefore, the responsible ministry must give this issue serious attention by integrating physical education into student assessments, granting it additional hours in the weekly schedule (such as two sessions per week), or increasing its coefficient from 1 to 2 to emphasize its importance.

### **Cours 9: Principles of Learning in Educational Physical Activity and Sports**

Fundamental Principles to Follow When Learning and Training Sports Skills and Movements

#### 1. The Principle of Conscious Knowledge and Effectiveness

The primary and leading role in learning within physical education is held by the teacher. However, regardless of the teacher's ability to convey information, it is essential to instill in learners (students) the desire for knowledge and active participation in activities during lessons. To apply this principle, the following aspects must be cultivated in students:

- Positive attitudes toward engaging in physical activity and understanding the objectives and educational value of physical education and sports.
- Active participation in the educational and training activities.
- Self-evaluation of their physical activity outcomes and the results they achieve.

The fundamental responsibility here is to instill awareness and comprehension of the purpose of physical activity and the benefits gained from participation. If many students disengage from sports activities, it indicates a lack of awareness or inefficiency in those responsible for the educational activities. This highlights the importance of emphasizing the principle of knowledge through awareness.

All activities that students voluntarily engage in represent a form of awareness. To ensure that the educational process has value and that students understand its benefits, learners must be aware of the following:

- The concept behind each physical task.
- The practical principles of the presented exercise or training.
- The ability to analyze the neuromuscular sensation of each exercise.

During the training or educational process, the teacher must adhere to learning rules, such as explaining the objective of each new training task, teaching students to identify and correct mistakes independently, and objectively recording their progress.

### 2. The Principle of Clarity

Sensory perception plays a significant role in motor learning and serves as the initial stage of this process. Clarity is one of the essential aspects during the phase of introducing

sports exercises and equipment. It is reflected in the way movements are presented and the detailed analysis of their different stages.

Clarity refers to the correct transmission of theoretical information and its proper application to students' sensory perception systems, ensuring they can easily comprehend and absorb it. To ensure clarity in the learning process, the following rules should be followed:

- Defining the motor skill that needs clarification or additional explanation.
- Guiding learners to achieve comprehensive sensory perception of movements by engaging multiple senses simultaneously.
- Using audiovisual aids only when necessary.

### 3. The Principle of Regularity and Gradual Progression

Gradual progression in learning motor tasks follows a structured system that allows for effective acquisition of movement skills. When planning exercise practices, it is essential to distribute tasks (exercises) in a way that each task builds upon and reinforces the previous one while also improving overall results.

The principle of regularity in physical activity also involves the consistent repetition of exercises. This requires:

- Determining the optimal repetition frequency for exercises and the appropriate rest period between each one.
- Monitoring exercises and balancing workload intensity and volume.

To ensure consistency in learning, the following must be adhered to:

- Early planning of educational or training tasks and defining their sequence.
- Continuous assessment of educational or training outcomes.
- Ensuring regular practice without extended time gaps.
- Encouraging frequent repetition of activities while incorporating diverse engagement methods.

### **Cours 10: Principles of Learning in Physical Activity and Sports (Continued)**

### 4. The Principle of Ease

To achieve the principle of ease, all necessary elements must be incorporated into the learning process, including presentation, explanation, learning material, and workload. Several factors contribute to making it easier for learners to absorb the skill effectively, including:

- 1. Proper selection and distribution of exercises according to a gradual level of difficulty.
- 2. Considering age, gender, and individual characteristics of learners.

To ensure ease in learning, the following aspects must be taken into account:

- Gender: Whether the learner is male or female.
- Learners' qualification level: Assessing their prior knowledge and skills.
- Age characteristics of the learners.
- Individual differences among participants.

### 5. The Principle of Stability

The principle of stability in sports activities refers to maintaining acquired motor skills. The importance of this principle lies in ensuring that learning achieves its goal of developing essential motor abilities, such as jumping skills. To stabilize movement, the following conditions must be met:

- Full comprehension of the movement, both theoretically and practically.
- Organized and repeated practice of learned skills.
- Distributing repetitions over multiple days instead of excessive repetition in a single day.
- Balancing the number of repetitions with appropriate rest periods.
- The instructor must promptly correct errors as they arise.

When repeating components of a complex skill, learners should first practice them separately and then integrate them as a whole to establish a strong connection between different parts. Each of the five previously mentioned principles should not be viewed in isolation when learning or practicing motor skills. A successful teacher is one who integrates these principles holistically within the educational process, ensuring a smooth transition from defining the learning objective to achieving complete mastery of the movement.

### **Cours 11 : Standards and Basic Rules for Selecting a Teaching Method**

### 1. Standards for Selecting Teaching Methods:

The choice of teaching methods is based on several criteria, some related to open teaching, others to students, teachers, or the specific conditions of the classroom environment. Below are the key criteria:

### 1.1 The method should align with the teaching objective:

Whether the goal is knowledge-based instruction or value-oriented teaching, the method must provide opportunities for students to practice relevant skills. For instance, if the teacher aims to teach students how to measure a patient's blood pressure, the method should include practical training.

### 2.1 The method should suit the subject matter:

For example, when teaching students how to test for sugar in urine, using a lecture format would be inappropriate compared to laboratory exercises.

### 3.1 The method should be appropriate for the number of students:

The chosen method should consider class size. For instance, using a discussion method in a session with 200 students would not be effective.

### 4.1 The method should consider individual differences among learners:

Since students have diverse abilities and learning styles, it is important to use a variety of teaching methods.

### 5.1 The method should match students' relationship with the subject matter:

For example, when teaching beginners in physiology, the teacher should select a method that helps students become familiar with terminology and fundamental skills.

### 6.1 The method should align with the teacher's capabilities and knowledge:

Teachers should choose methods that match their expertise, familiarity with the subject, and teaching experience. This does not mean they should avoid trying new methods but rather select those that best fit their skills and interests.

### 7.1 The method should suit the relationship between the teacher and students:

If there is a lack of mutual trust between the teacher and students, the selected method should help foster and build that trust.

# 8.1 The method should be compatible with the available material and human resources in the school:

Some methods, such as laboratory-based approaches, may require expensive equipment and highly trained lab technicians to operate them effectively.

#### 2. The Basic Principles on Which Teaching Methods Are Based

Teaching methods are built upon a set of fundamental principles, which we will outline as follows:

Education is a process that must consider the student from all aspects—physical, intellectual, psychological, social, and emotional. Therefore, it is essential to pay attention to teaching methods and their principles to facilitate the teacher's task in delivering information and achieving objectives with minimal effort and maximum efficiency. This also helps students learn effectively and develop properly.

#### 2.1 Progression from the Known to the Unknown:

Students can only grasp new information effectively if it is connected to their prior knowledge. Linking new information to what students already know helps spark their interest and curiosity when learning a new skill.

For example, when teaching shooting techniques in basketball or handball, students should first learn the fundamental skill of throwing.

### 2.2 Progression from Easy to Difficult:

What is considered "easy" refers to concepts that are already clear to students. Therefore, teachers should begin with fundamental skills that seem simple to students and then gradually add more details and complexities until they reach a more advanced stage.

### 2.3 Progression from Simple to Complex:

This principle is based on the idea that the mind perceives things as a whole before recognizing their individual parts and details. For example, in teaching the high jump, students should first practice jumping from a stationary position before learning approach steps.

### 2.4 Progression from the Concrete to the Abstract:

Students first understand sensory experiences before transitioning to abstract concepts. Therefore, teachers should ensure students perform a forward roll before explaining the mechanical principles behind the movement. Additionally, teachers should use teaching aids that engage as many senses as possible to ensure a thorough understanding of the concept.

### 2.5 Transition from Practical to Theoretical Learning:

Teachers should follow this principle to guide students in exploring facts and understanding their surroundings. For example, students should first engage in practical play of team sports such as basketball or volleyball before delving into the theoretical rules governing the game. (Saïd Mazrou' et al., 2016, pp. 85–88)

### **3. Definitions of Physical Education Teaching Methods**

A successful teaching method is one that effectively achieves the desired goals of the lesson in the shortest time, with minimal effort, and using the most appropriate means. However, there is no single perfect method that can be used to achieve all the objectives of a physical education lesson. A method that suits students at a particular stage may not be suitable for another stage. Likewise, the method used to teach volleyball skills differs from the one used for exercises or football, and so on.

It is the teacher's responsibility to determine and select the most suitable teaching method to achieve the best possible outcomes. Since definitions of physical education teaching methods vary, we have compiled the most significant ones below:

- First Definition: The concept of physical education teaching methods includes "planning, preparation, leadership, organization, and implementation of a physical education lesson. It also involves defining the objectives and specific tasks assigned to the lesson."
- Second Definition: According to Afaf Othman Othman's book, physical education teaching methods refer to "the means, techniques, and procedures used to organize student interactions in educational situations to acquire educational experiences related to the objectives of physical education for each age group. This depends on the goals intended to be achieved in the educational context, as well as the teacher's ability to present various scenarios within the lesson."
#### 4. Categories of Teaching Methods in Physical Education and Sports

Various teaching methods are used in physical education, which can be categorized into two main sections:

- 1. Methods for Teaching Information and Knowledge.
- 2. Methods for Teaching (Learning) Motor Skills.

#### 1. Methods for Teaching Information and Knowledge:

This method is used to train students in theoretical subjects related to physical education, such as the history of games and different sports, the philosophy of physical education, health education, psychology, kinesiology, biomechanics, anatomy, and physiology. It also includes theoretical aspects related to practical subjects, such as game strategies, international rules of games, and safety procedures.

There are various methods for teaching information and knowledge, including:

- Textbooks
- Lectures
- Question and Answer
- Group Discussions
- Projects
- Experiments
- Demonstrations
- Problem-Solving
- Homework
- Inviting and Consulting Experts

#### 1.1 Methods for Enhancing Student Participation in Class:

Enhancing future participation contributes to shaping the student's personality and fostering comprehensive personality development.

A successful teacher, through guiding students, influences how they organize their work by using direct and indirect persuasion and guidance. Student contributions are particularly evident in the following areas:

- Independently changing stations in circuit training.
- Assembling, disassembling, and organizing large equipment.
- Monitoring sportswear compliance.
- Assisting in organizing school sports festivals.

## **1.2 Methods of Persuasion in Physical Education Class:**

- Films (educational films, documentaries, or regular feature films related to physical education).
- Presenting the history of famous athletes (providing students with a clear picture of the structured and challenging journey of renowned athletes).
- Creating sports wall magazines, illustrated sports magazines, sports slogans displayed in the classroom or school, and distributing sports awards to outstanding students in physical activities.

## **1.3 Methods for Instilling Habits in Physical Education and Sports Class:**

- Developing discipline.
- Ensuring good organization and strict order.

## 1.4 Motivation Methods in Physical Education Class (Reward and Punishment):

The teacher uses motivation to achieve two objectives:

- Eliminating certain disciplinary issues within the classroom.
- Overcoming inhibitors that affect students' motor performance—either individually or as a group—such as hesitation, shyness, and fear.

## **Motivation Methods Include:**

- Verbal or written praise.
- Expressing gratitude to the student in newspapers and recognizing their achievements.
- Competitive methods, such as organizing contests that stimulate motivation.

• Punishment methods, such as verbal or written reprimands directed at the student or their parents, followed by warnings, expulsion from class, or isolation.

## **1.5 Teaching and Learning Methods:**

- First group: Teacher-centered methods (Lecture method Deductive method).
- Second group: Methods based on both teacher and student effort.
- Third group: Self-learning methods. (Saïd Mazrou' et al., 2016, pp. 90-94).

## **Cours 12 : Methods of Learning Motor Skills in Physical Education Class (Continued)**

**Methods of Learning Motor Skills in Physical Education and Sports:** There are three main methods for learning motor skills in physical education and sports:

#### **A** – The Part Method:

This method involves breaking down the motor skill into stages and learning each stage sequentially. It is commonly used for teaching difficult and complex skills.

Isam Abdel Khalek states: "It is more commonly used in learning complex skills composed of intricate parts. This method suits skills that can be divided into segments."

He further adds: "In this method, the skill is broken down into small parts, with each part taught separately. Once the learner masters one part, they move on to the next, continuing until they have learned all the fundamental parts of the movement. Afterward, the learner performs the skill as a whole."

Many educators prefer using the part method, relying on the principle: "To master the whole, one must first master the parts. Learning individual components makes acquiring the entire movement relatively easier."

Abbas Ahmed Saleh Al-Samarrai, in discussing motor skill learning, states:

- Begin by learning the main and most important part of the movement, followed by the less critical parts. That is, after mastering the first part, the learner moves on to the next in order of importance.
- Learn the parts in their sequential movement order. Therefore, the coach must accurately and efficiently determine how to divide and arrange the movement's segments before beginning instruction.

#### **B** – The Whole Method:

In this method, the skill is presented as a complete unit without breaking it into parts. The learner performs the entire movement as a whole.

#### Advantages of the Whole Method:

• Helps learners understand the relationships between different components of the motor skill, leading to faster learning and mastery.

• Aids in establishing motor memory, as the learner recalls and retrieves the skill in its entirety.

Regarding the relationship between skill type and the appropriate teaching method, Afaf Abdul Karim states: "Closed skills should be taught as a whole whenever possible, because the rhythm of a movement performed in parts does not match the rhythm of the whole movement. Each part of the movement is, in reality, a preparation for the next. There is no guarantee that a learner who can perform each part separately will succeed in executing the skill as a whole."

To successfully implement the whole method, the following conditions must be met:

- The motor skill must be short, so that the number of mistakes made is minimal.
- Suitable visual aids should be available to help learners develop the correct motor imagery.
- The skill should be easy to perform, meaning it should not be complex and must be appropriate for the learners' physical and cognitive abilities.

The researcher adds that learning through the whole method saves a significant amount of time and enables a comprehensive understanding of the skill. However, the difficulty of applying this method arises when there is a flaw in one part of the skill, forcing the teacher to isolate and teach that part separately.

#### **C – The Whole-Part Method:**

This method allows overcoming the drawbacks of both the whole and part methods. Some skills require a combination of both methods to achieve the desired learning outcome.

Abbas Ahmed Al-Samarrai states: "The whole-part method can serve as a middle ground between the two approaches."

To apply this method, the following conditions must be considered:

- Teaching the motor skill as a whole in a simplified manner at first.
- Teaching the difficult parts separately, while integrating them into the overall performance of the motor skill.
- Ensuring that the skill's components are divided into integrated and interconnected units when practicing them as parts.

Thus, it can be concluded that any of the aforementioned methods can be used to teach motor skills. However, the conditions outlined must be taken into account to save time, reduce costs, and make full use of the teacher's available resources. (Attallah Ahmed, 2006, pp. 164-169).

#### **Cours 13 : Teaching Methods in Physical Education Classes**

#### Introduction:

Teaching methods in physical education refer to all the means and strategies used to organize students in a dynamic way that allows achieving the lesson's objectives as efficiently as possible. The main methods of conducting a lesson are as follows:

#### A – The Group Method:

In this method, students perform exercises and skills collectively, with a suitable physical load and using uniform equipment. It is used in individual sports lessons such as running and various types of jumping, as well as in team sports. This method is convenient because it allows a large number of students to learn simultaneously. It is often applied when introducing new material. However, one of its disadvantages is the difficulty in correcting mistakes and monitoring individual performances. In this method, the teacher's position in the lesson plays a significant role in observing students' performance.

#### **B** – The Sequential (Queue) Method:

Here, students perform exercises and skills one after the other in sequence, without stopping. This method can be organized with any number of queues, depending on the available conditions and resources. Its advantages include the ability to observe individual differences, maintain the structural integrity of the lesson, and better regulate physical workload. It is widely used in gymnastics and various types of jumping. However, one of its drawbacks is the waiting time that students experience before their turn, which may lead to boredom.

#### **C** – The Alternation Method:

In this method, students perform exercises and skills in alternating turns. They are divided into groups that take turns performing exercises. The first group performs the exercise, followed by another group after the first returns to its place, and so on. This method is commonly used in high jump and throwing sports. (Mahmoud Awad Basyouni & Faisal Yassin Al-Shati, 1992, pp. 116-117).

#### **D** – The Group (Workshop) Method:

In this method, the teacher divides students into teams that are distributed across different workstations, performing exercises simultaneously but separately. The teacher must

move between groups to monitor, correct, and guide the students. (Ministry of National Education, 2006, p. 97).

This method is commonly used in practical activities, where students practice two or three skills before switching stations. Outstanding students can be assigned to supervise and assist other groups.

## **E** – The Individual Method:

This method is typically used for evaluating students' skills that require individual performance. The teacher observes each student separately, identifying mistakes and assessing abilities. (Mahmoud Awad Basyouni & Faisal Yassin Al-Shati, 1992, p. 117).

#### **Cours 14: The Physical Education Teacher**

#### **Introduction:**

According to Boldyrow, the teacher is a leader who organizes and initiates the unit of work and activities within the classroom. Their role is not only to provide students with knowledge, skills, and assessments in cognitive and practical aspects but also to organize and develop the classroom socially.

William Clark believes that the teacher is a designer of the learning environment. They create educational systems, define lesson objectives, list educational situations, and determine the strategy that students will follow to interact with these situations effectively. They also set performance levels that students should achieve and establish methods for evaluating their performance.

According to Bonboir, the components of the educational profession, through their unity and interrelation, give the teacher's activity a defined direction and shape their work in the style of an educator. Therefore, professional selection for a specialized role requires a link between the nature of the role and its required skills and competencies.

Thus, the role of the physical education teacher is crucial in achieving the educational objectives of the curriculum. This role demands a teacher with high levels of competence and intellectual, technical, and human skills. (Mohamed Al-Hamahmi & Amin Al-Khouli, 1990, pp. 196-197).

#### **Essential Qualities of a Physical Education Teacher:**

Several key elements must be present in a physical education teacher to ensure they can perform their duties effectively. The most important of these are:

- 1. Personality
- 2. Experience
- 3. Professional Preparation
- 4. Health
- 5. General Culture (Zeinab Ali Omar et al., 2016, p. 69).

Another perspective suggests that a physical education teacher should possess the following qualities:

- 1. A parental approach The teacher should act as a father figure before being an instructor, maintaining a good relationship with students and embodying justice, integrity, and dedication.
- Teaching ability The teacher should be an effective educator, a good manager, and a wise decision-maker.
- Belief in education's role The teacher should see education as a means to strengthen society.
- 4. Fairness The teacher should treat all students equally and justly.
- Love for knowledge The teacher should be knowledgeable, well-read, organized in thought, and good at making choices.
- 6. Modern teaching approach The teacher should adopt modern educational values such as cooperation, structured freedom, and motivation.
- Emotional control The teacher should have the ability to manage their emotions and remain calm.
- 8. Professional appearance The teacher should take care of their personal appearance and be pleasant.
- Intelligence and good judgment The teacher should be smart and able to make sound decisions.
- 10. Classroom management skills The teacher should be able to maintain order without being overly strict.
- 11. Role model behavior The teacher should be aware that students often look up to them as an example. (Amin Anwar Al-Khouli et al., 1998, pp. 42-43).

# **Second Semester Courses**

#### **Cours 1: Concepts in Sports Training Science**

#### **Introduction:**

Sports training is a purposeful and guided educational process based on scientific planning to prepare athletes of various levels and according to their abilities—whether they are juniors, youth, or advanced athletes. This preparation covers multiple aspects: physical, technical, tactical, and psychological, aiming to reach a high-performance level.

## **1. Definition of Sports Training:**

Based on the above, sports training can be defined as follows:

- **Matveev** defines it as: "It is the physiological, technical, tactical, mental, psychological, and moral preparation of the athlete through physical exercises and training loads."
- Mohamed Hassan Allawi defines it as: "It is an educational process that adheres to scientific principles and foundations, primarily aimed at preparing an individual to achieve the highest possible athletic level in a specific type of sports activity."

In light of this definition, we can conclude that sports training is an educational process fundamentally governed by the principles and laws of natural sciences (such as anatomy, physiology, and biomechanics) and human sciences (such as psychology and education). Its ultimate goal is to prepare the individual to reach the highest level of athletic performance allowed by their abilities, readiness, and potential in their specialized sports activity, which they practice voluntarily. (Mohamed Hassan Allawi, 1990, p. 36).

#### 2. The Modern Concept of Sports Training:

• **Mufti Ibrahim Hammad** defines modern scientific sports training as: "The educational and developmental processes aimed at raising and preparing athletes and sports teams through planning and practical field leadership, with the goal of achieving the highest possible performance levels in specialized sports and maintaining them for the longest period possible." (Mufti Ibrahim Hammad, 2008, p. 21).

#### 3. Characteristics of Sports Training:

Some of the key characteristics of sports training include:

- 1. Enhancing physical, psychological, and mental abilities of individuals through regular participation in sports activities, which improves overall health and makes individuals more effective members of society.
- Scientific knowledge-based approach: One of the most distinguishing features of modern sports training is its reliance on scientific knowledge and data. It derives its content from various natural and human sciences, such as sports medicine, biomechanics, kinesiology, sports psychology, education, sociology, and mathematics.
- 3. Individualized educational process: Sports training is highly individualized, as it considers the principle of individual differences, including skill levels, age, and gender.
- 4. Dynamic development of physical abilities: It considers the progressive development of physical capabilities based on relative age stages, as each age phase is characterized by the development of specific physical abilities.
- Continuity and long-term development: Unlike seasonal activities, sports training is an ongoing process rather than a short-term or seasonal endeavor that ends after a specific period. (Mohamed Hassan Allawi, 1990, pp. 36-39).

## 4. Duties of Sports Training

## **First: Educational Duties**

- Acquiring knowledge and information.
- Mastering tactical and competitive abilities.
- Comprehensive development of general physical attributes.
- Balanced development of specific physical attributes.
- Teaching and mastering specialized motor skills. (Saleh Mohamed Saleh Mohamed, 2017, p. 21).

## Second: Educational Duties

• Instilling a love for sports in youth and ensuring that high-level sports activities become a fundamental necessity for individuals.

- Shaping and elevating various individual motives, needs, and tendencies to primarily serve the nation by understanding the significant positive role played by high-level sports.
- Cultivating and developing noble moral traits such as patriotism, sportsmanship, and ethical behavior. (Mohamed Hassan Allawi, 1990, p. 41).

Based on the above, the most important educational and instructional duties of sports training can be translated into four (04) specific processes, each aimed at fulfilling a particular duty. These processes are:

A- Physical Preparation: Aims to develop physical abilities such as strength, speed, endurance, agility, and flexibility.

**B- Skill and Tactical Preparation:** Aims to teach motor skills and tactical abilities that athletes use during competitions, focusing on mastering and reinforcing them.

**C- Cognitive (Theoretical) Preparation:** Aims to provide athletes with knowledge and information related to training and the specific rules of their sport.

**D- Educational-Psychological Preparation:** Aims to prepare individuals from both educational and psychological perspectives.

These four processes should be viewed as interconnected components of a single system—the sports training process. (Mohamed Hassan Allawi, 1990, p. 42).

## Cours 2: The Importance, Objectives, and Areas of Sports Training

#### 1- Importance and Objectives of Sports Training:

- 1. Developing various coordination abilities of the nervous and muscular systems in alignment with the motor skills required for technical performance.
- 2. Enhancing general and specific physical abilities according to the requirements of motor performance.
- 3. Fostering team spirit and positive cooperation.
- 4. Focusing on flexibility and stretching exercises (muscle extension) at a high level to protect muscles, joints, ligaments, and tendons from injuries, especially when young athletes engage in strength training.
- 5. Emphasizing the cognitive aspect of young athletes by providing them with the necessary theoretical knowledge about sports training and related sciences.
- Ensuring the integration of physical, functional, technical, tactical, psychological, mental, moral, and cognitive states, which enable the athlete to perform optimally and sustain this state for the longest possible period. (Saleh Mohamed Saleh Mohamed, 2017, pp. 10-11).

#### 2- Areas of Sports Training:

The areas of sports training can be classified as follows:

**First Area: School Sports :** Sports training is an integral part of the motor learning process and should be developed in school lessons for two essential reasons:

- First, to improve students' functional aspects.
- Second, to assist in learning sports skills.

**Second Area: Mass Sports :** Mass sports are for everyone—regardless of age, strength, or gender. Everyone should engage in physical activity according to their physical, motor, and functional capabilities, not for competition or championships but to maintain suitable physical, motor, and health fitness in relation to their gender, age, skill level, and daily activities. (Saleh Mohamed Saleh Mohamed, 2017, pp. 17-18).

Third Area: Sports for People with Disabilities : Practicing sports activities is not limited to a specific group, sector, or class of society. Therefore, all members of the community—

young and old, men and women, able-bodied and disabled—should participate in sports according to their needs and capabilities.

**Fourth Area: Therapeutic Sports :** Many rehabilitation centers and advanced training facilities have been established in various countries to accommodate numerous patients seeking recovery. Special rehabilitative physical exercises play a positive role in this process. (Saleh Mohamed Saleh Mohamed, 2017, pp. 18-19).

**Fifth Area: High-Performance Sports :** The term "high-performance sports" has become synonymous with training for championships, often referred to as the "championship sector." This type of training focuses on athletically gifted individuals across different age groups. (Saleh Mohamed Saleh Mohamed, 2017, p. 19).

## First: Sources and Foundations of Modern Scientific Sports Training

- Scientific sports training derives a significant portion of its theories, foundations, and principles from various sciences that encompass both theoretical and practical aspects, as illustrated in Figure (01).
- As seen in the following figure, all scientific principles and foundations derived from these sciences converge into a single framework along with the core sciences of sports training. These elements merge, interconnect, and complement each other within the operational theories shown in Figure (01), which are carried out by the technical and administrative staff.



## **Cours 3 : Principles of Sports Training**

### **Third: Principles of Sports Training**

There are many principles of sports training, the most important of which include:

## 1- The Principle of Progressive Training Load (Progression) or Gradation (La Gradation):

- The gradual increase in training load should occur over an appropriate period by controlling its components (intensity, volume, and density).
- Athletes must be exposed to a higher level of training load at the right time to trigger a new adaptation process, resulting in an improved performance level.
- The principle of progressive load does not mean continuously increasing the load indefinitely; rather, it is essential to stabilize the acquired adaptation level for an appropriate period before gradually increasing the load again.
- A rapid or excessive increase in training load leads to several harmful consequences, including:
  - Fluctuation in the athlete's performance level;
  - Inability to maintain performance at a high level for an extended period;
  - Decline in the athlete's performance;
  - Increased risk of injuries and illnesses.
- Most common injuries in endurance sports result from a rapid progression in training load (increased intensity and density).
- When applying the principle of progressive load, it is advisable to follow the guideline: "Make progress slow."
- The concept of progressive increase applies not only to exercises within a single training session but also to:
  - Gradual transition from parts to the whole;
  - Gradual transition from quantity to quality;
  - Gradual transition from general to specific training.

#### 2- The Principle of Overload (Overload):

To improve a physical attribute, training must be conducted with a load at the maximum limit (external limit) of the athlete's capacity. This means that in order to enhance the physical performance level of athletes, the applied load must be close to the maximum they can endure. As the body adapts to the load, additional loads must be introduced so that training remains at its maximum limit. (Mufti Ibrahim Hammad, 2008, pp. 50-52).

#### 3- The Law of Reversibility: "If You Don't Use It, You Lose It."

If an athlete does not engage in regular training, endurance will not be maintained, and the body will not need to adapt. Consequently, an individual's fitness level will gradually return to its original state. For training to be effective, the coach must understand the relationship between adaptation, the overload principle, and the law of reversibility. Physical fitness improves as a direct result of the proper balance between load and recovery.

The term progressive overload is used to indicate that an increase in training load will lead to improved adaptation and recovery, resulting in higher levels of physical fitness. The increase in load should include variables such as a greater number of repetitions, faster execution of repetitions, reduced rest periods, and increased weights. (Saad Saud Fouad, n.d., p. 29).

#### 4- The Principle of Continuity (Continuity):

The principle of continuity in sports training is crucial, as it helps athletes maintain the functional efficiency of their physiological systems. Once an athlete reaches an appropriate level of development in a physical fitness component, training must continue to target that specific component; otherwise, the body will return to its pre-training state. Each fitness component requires a specific period for its development. (www.sites.google.com/view/black-horse-fitness-club).

Repeating and sequencing training sessions is essential for mastering certain physical tasks. Long-term training leads to profound and lasting physiological changes, which must be maintained using the same methods that initially induced them. This continuity applies to training cycles, periods, seasons, and an athlete's entire career. (Drissi Bouzid, 2009, p. 52).

#### 5- The Principle of Repetition (Repetition):

The principle of repetition is essential in sports training, particularly for developing physical fitness components and reinforcing specific motor skills related to a particular activity, making them automatic. (Drissi Bouzid, 2009, pp. 52-53).

#### 6- The Principle of Regularity (Principle of Regularity):

Overload should be applied consistently in training sessions while ensuring adequate time between sessions to allow the body to recover and achieve optimal recovery.

#### 7- The Principle of Variety (Principle of Variety):

Serious training can place a high burden on an athlete's body and requires a long time due to increased training volume and intensity. This high-volume training can become monotonous, which the coach must avoid by introducing variety into the daily training sessions. Essentially, activities should be structured so that short, intense exercises are followed by less demanding exercises or relaxation exercises. When training sessions become boring, the coach may introduce a drastic change in exercises for a day or more to maintain the athletes' interest and eliminate boredom. (www.sites.google.com/view/black-horse-fitness-club).

#### 8- The Principle of Wave-like Loading (Wave-like Loading):

Elite athletes do not train using the same session daily; they vary their training sessions, alternating between intense and less intense sessions (a hard day followed by an easier day). A hard day is characterized by a high-intensity training session, where the athlete exerts maximum effort in performing exercises.

The improvement in the body's functional systems results from the intensity of the exercise rather than the duration of training. However, the duration of high-intensity exercise varies depending on the attribute being developed. To achieve the desired training effect, the athlete must be given sufficient time to recover. This is done through subsequent sessions that impose less stress on the body's systems, allowing recovery and leading to improved performance levels.(https://www.sport.ta4a.us/human-sciences/athletic-training/62-Principles-of-Training.html).

#### 9- The Principle of Individual Response (Individual Response):

Athletes' bodies respond to training individually, depending on their unique characteristics. Athletes do not respond identically to the same training program. For example,

if a group of athletes undergoes the same training load, each will exhibit a different level of response.

Individual training responses vary due to several factors, including differences in maturation, genetics, environmental influences, nutrition, sleep, rest, physical fitness levels, illnesses, and motivation. (Saleh Mohammed Saleh Mohammed, 2017, pp. 28-29).

#### **Cours 4: Training Methods in Sports**

#### **Sports Training Methods**

It is impossible to discuss sports training methods without addressing training means, as these constitute the fundamental base for any training approach or methodology. They determine the strategy for executing any training scenario or exercise. Therefore, it is essential to organize the acquired knowledge in sports training science. Among the fundamental training means, we find the key components of training load, namely volume, intensity, and density. Hence, we will discuss each component separately in detail.

#### **First: Training Load in Sports**

When an athlete performs an exercise—whether physical, skill-based, or tactical—this performance affects various functional systems in the body to a certain degree. For example, the muscular system experiences increased muscle tension (muscle contraction) in proportion to the intensity of the exercise. Simultaneously, the heart rate increases, and the nervous system is stimulated according to the exercise's intensity. (*Mufti Ibrahim Hammad, 2008, p. 63*).

Training load is the fundamental basis of sports training and serves as the primary tool for enhancing an athlete's physical fitness. It contributes to improving the functional efficiency of the body's systems, thereby developing and refining physical attributes, mastering motor skills, and enhancing tactical abilities.

#### 2.1- Definition of Training Load

- A/ Training load is the primary means of influencing an individual, leading to the enhancement of the functional and physiological efficiency of body systems and organs. Consequently, it helps in developing physical attributes, motor skills, tactical abilities, and voluntary traits.
- B/ HARA's Definition: Training load is the physical and mental burden placed on various body systems (nervous, circulatory, respiratory, muscular, endocrine, etc.) as a result of performing purposeful physical activities.
- C/ Matveev's Definition: "A specific amount of influence exerted on different organs and systems of an individual during physical activity." (Mohamed Hassan Allawi, 1990, p. 51).

## **3.1- Importance of Training Load:**

•

 $\checkmark$  Training load is an effective means of influencing an athlete due to the functional and external changes in the body's vital systems.

 $\checkmark$  It enhances motor coordination efficiency while adapting body systems and developing abilities properly.

 $\checkmark$  It contributes to the athlete's performance improvement when scientific principles are correctly applied in accordance with the athlete's efficiency to achieve the desired goal.

## **4.1-** Types of Training Load:

Most scientific sources on sports training indicate that there are two types of load: external load and internal load.

## **A-External Load:**

This refers to the load exerted through the influence of load components (intensity, volume, and density).

- It consists of the set of exercises and movements performed by the individual during a training session or multiple sessions.
- It represents the number of exercises or the amount of work completed in a training session, including **volume, intensity, and density**, which determine the level of stimulus and the number of repetitions. (*Saleh Mohamed Saleh Mohamed, 2017, p. 48*).
- The goal of external load may be to develop certain physical attributes such as muscular strength, aerobic or anaerobic endurance, motor skills like speed and agility, or tactical abilities. (*Mufti Ibrahim Hammad, 2008, p. 64*).

#### A.1- Factors Affecting External Load:

- 1. The athlete's psychological and physical condition.
- 2. Condition of sports equipment.
- 3. Climatic conditions (temperature, wind, atmospheric pressure, humidity, rain, cold).
- 4. Altitude of the training location.

- 5. Strength of the opponent in individual sports.
- 6. Social relationships.
- 7. The athlete's nutrition. (*Graduate students at the Faculty of Physical Education and Sports Sciences*, 2015, p. 3).

#### **B- Internal Load:**

This refers to the degree of functional and physiological responses and changes in the body's systems that occur as a result of (or due to the influence of) the external load.

#### 5.1- The Relationship Between Internal Load and External Load:

There is a relationship between external load and internal load, as the response of an individual's body organs and systems corresponds to the external load and its effects. The greater the external load (intensity, volume, density), the greater the degree of changes and responses in the individual's body systems, and vice versa. (*Mohamed Hassan Allawi, 1990, p. 54*).

#### **6.1-** Components of Training Load:

Training load consists of the following key components: intensity (intensité), volume (volume), and density (densité).

#### 6.1.1- Intensity:

Intensity refers to the speed, force, or difficulty level of performance. The measurement units used to determine intensity include:

A- Speed level: Measured in seconds or minutes, as in running or swimming.B- Resistance strength level: Measured in kilograms, as in weightlifting or exercises involving weights.

**C- Performance distance:** Measured in centimeters or meters, as in jumping and throwing events in athletics.

**D- Performance timing (fast or slow play):** As seen in sports like football, basketball, or individual combat sports such as boxing and wrestling.

**E- Heart rate:** Measured by the number of heartbeats during peak performance and at rest in various sports. (*Mohamed Hassan Allawi, 1990, p. 52*).

## 6.1.2- Volume:

Training volume refers to the distances, durations, or weights an athlete performs within a specific period (training session, day, week, etc.). It represents the number of repetitions in a single exercise and the total number of repetitions of the same exercise within a session. It also includes the total repetitions in a training session and the duration of the stimulus (exercise). Training volume consists of two dimensions: (*Graduate students at the Faculty of Physical Education and Sports Sciences, 2015, p. 8*).

**First dimension:** The duration of a single exercise, meaning the period in which a specific exercise impacts the body's organs, such as running 100m, swimming 200m, or lifting 50kg once.

**Second dimension:** The number of repetitions of a single exercise, such as running  $100m \times 4$ , swimming  $200m \times 4$ , or lifting  $50 \text{kg} \times 10$ . (*Mohamed Hassan Allawi, 1990, p. 52*).

#### 6.1.3- Density:

Training load density refers to the time ratio between the load and rest periods during a single training session. The proper balance between load and rest is crucial for ensuring the athlete's relative recovery (i.e., regaining a state of recovery), which in turn ensures the ability to continue working, performing, and tolerating further training loads.

The duration of the rest period depends on the intensity and volume of the load. As a general rule, by the end of the rest period, the athlete should reach a state that allows them to ideally repeat the next exercise. Scientists suggest that an appropriate recovery period is one where the heart rate returns to around **120 beats per minute**.

Rest periods are classified into two main types:

**A- Passive Rest (inactive, ineffective):** A period where the athlete does not engage in any physical activity, such as standing, sitting, or lying down after a physical exercise. **B- Active Rest (active, effective):** A recovery phase where the athlete engages in specific physical activities that aid in regaining the ability to perform another sports activity. Examples include flexibility and relaxation exercises after intense strength training or light jogging and muscle stretching after sprinting. (*Mohamed Hassan Allawi, 1990, pp. 52-53*).

Some recommendations for using active rest include:

 $\checkmark$  The training load during the active rest phase should be lower than the previous load during training.

 $\checkmark$  Some exercises can involve muscle groups that were not engaged in the previous activity.

 $\checkmark$  Sometimes, a combination of passive and active rest can be used, with active rest coming first, followed by passive rest.

Training load density is calculated using the following formula:

## (Load Volume) / (Rest Time + Exercise Performance Time) = Load Intensity

**Applied Example (1):** If the total training unit volume for a specific exercise is 2400 m, it can be divided into different segments depending on the training objective and method.

**Proposal (1):** If the goal of the training is to improve general endurance:

- Volume: One-time repetition.
- Load: 2400 m
- Intensity: Moderate intensity with heart rate reaching 150 bpm.
- **Density:** No rest.

**Proposal (2):** If the goal of this training is speed endurance, the required task is to calculate the load density:

- Volume: 4 repetitions, 3 sets.
- Load: 200 m
- Intensity: Submaximal (heart rate reaching 180 bpm).
- **Density:** Rest between repetitions = 1 minute; rest between sets = 4 minutes.

#### **Calculations for Training Volume in Proposal (2):**

- Training volume (workload):  $(200 \text{ m} \times 4) \times 3 = 2400 \text{ m}$
- Total rest time:  $[(1 \min \times 3) \times 3] + [4 \min \times 2] = 9 + 8 = 17 \min \times 60 = 1020$  seconds.

#### **Exercise Performance Time:**

Given that the athlete covers a distance of 200 m in 20 seconds, the time for completing the exercise is:

 $(20 \sec \times 4) \times 3 = 240 \sec(20 \det \sec \sin 4) \pm 3 = 240 \det \sec \sec (20 \sec \times 4) \times 3 = 240 \sec \sec \sec \sec \sin 4)$ 

## Load Density Calculation:

Target load density = 2400 m / (1020 sec + 240 sec) = 2400 / 1260  $\approx$  1.90 sec/m

**Example 3:** If training is performed using weights:

- Volume: 6 repetitions × 3 sets
- Load: 80 kg
- Intensity: 80% of one-repetition maximum (100 kg).
- **Density:** Rest time is sufficient for one breath (~3 sec).

Rest time between repetitions = 3 sec, rest time between sets = 5 min, and execution time for one repetition = 10 sec.

## Load Density Calculation for This Training Unit:

- Workload (Training Volume): (80 kg × 6 × 3) = 1440 kg
- Total rest time =  $[(3 \sec \times 5) \times 3 + (5 \min \times 2)] = [45 \sec + (10 \min \times 60)] = 645$ seconds
- Performance time =  $(10 \text{ sec} \times 6 \times 3) = 180$  secondsFinal Load Density Calculation:

**Target load density** =  $1440 / (180 + 645) = 1440 / 825 \approx 1.74 \text{ sec/kg}$ 

#### 7.1- Levels or Degrees of Sports Training Load:

The levels of training load can be classified according to the two factors of intensity (load intensity) and volume (load volume) into the following degrees or levels:

## 1.7.1- Maximum Load:

This is the highest level of load an individual can endure, characterized by a very strong burden on the body's organs and systems (cardiorespiratory system, nervous system, muscular system, etc.). It requires a very high level of concentration, and the athlete shows clear signs of fatigue during performance. Additionally, it requires long rest periods for the athlete to recover. (Mohamed Hassan Allawi, 1990, p. 55).

- The intensity of the load ranges between 90% and 100% of the individual's maximum capacity, with a low number of repetitions or short durations (1-5 times).
- The rest period is relatively long, allowing for recovery, typically 4-5 minutes on average, though it may vary depending on the training objective.
- The maximum load is used to improve an athlete's physical, technical, and tactical abilities, including aerobic and anaerobic endurance, speed, agility, coordination, joint flexibility, and muscle elasticity. It also helps develop skills and tactical abilities in competition conditions. (Mufti Ibrahim Hammad, 2010, pp. 84-85).

## 2.7.1- Sub-Maximal Load:

This load is slightly lower than the **maximum load**. The athlete still exhibits signs of fatigue and requires long rest periods for recovery. This intensity level aims to enhance the efficiency of the body's functional systems and is characterized by:

- An intensity ranging from 75% to just below 90% of the individual's maximum capacity, performed under anaerobic conditions.
- A long rest period, though slightly shorter than that required for maximum load performance.
- Moderate repetitions, ranging from 6 to 10 times. (Mohamed Hassan Allawi, 1990, p. 55).
- Used to develop certain physical fitness elements related to motor and tactical skills and to maintain fitness levels. (Mufti Ibrahim Hammad, 2010, p. 88).

## 3.7.1- Moderate Load:

This load level places a moderate burden on the body's organs and systems, causing a moderate level of fatigue after performance.

- The intensity ranges from 50% to just below 75% of the individual's maximum capacity, with repetitions between 10 and 15 times. (Mohamed Hassan Allawi, 1990, p. 56).
- Widely used to reduce training load after applying maximum and sub-maximal loads.
- Frequently used one or two days before a competition.
- Helps improve motor and tactical skills. (Mufti Ibrahim Hammad, 2010, p. 92).

#### 4.7.1- Low Load:

- This level imposes a lighter than moderate burden on the body's organs and systems, requires minimal concentration, and does not cause significant fatigue.
- The intensity ranges from 35% to just below 50% of the individual's maximum capacity, with a high number of repetitions or long durations (15-20 times). (Mohamed Hassan Allawi, 1990, p. 56).
- Used for learning motor and tactical skills.
- Helps reduce stress caused by maximum or sub-maximal loads.
- Frequently used in warm-up and cooldown exercises during a training session. (Mufti Ibrahim Hammad, 2010, p. 96).

## 5.7.1- Active Rest (Low Load):

This level is characterized by a minimal load, often involving relaxation exercises, walking, light jogging, or fun-based small games. It helps an individual achieve physical and mental relaxation and is commonly used during active rest periods.

The intensity is less than 30% of the individual's maximum capacity, with a very high number of repetitions (20 to 30 times) and long durations. (Mohamed Hassan Allawi, 1990, p. 57).

## **Cours 5: Continuation of Sports Training Methods (Load Regulation)**

#### **Controlling Load Levels (Load Regulation) in Sports Training:**

A sports coach can use various methods to regulate the levels or intensities of training loads to achieve the desired goal. Some of these methods include:

- 1. Changing the intensity of the load.
- 2. Changing the volume of the load.
- 3. Changing the rest intervals.
- **1.8.1 Changing Load Intensity:** Examples include:
  - **A. Changing the speed level:** Increasing or decreasing the speed in exercises that involve repetitive movements, such as running, swimming, and rowing.
  - **B. Changing the weight used:** Adjusting the amount of weight used in strength training exercises.
  - C. Changing the timing of performance: Adjusting the speed of execution in physical exercises, such as increasing or decreasing the duration of jump rope exercises.
  - **D. Changing the nature of obstacles to overcome:** Adjusting the height of hurdles in jumping exercises or training against passive or active defenders.

#### 2.8.1 - Changing Load Volume:

Examples include:

- A. Adjusting the duration of performance: Increasing or decreasing the duration of a single exercise. For instance, if jump rope exercise lasts 30 seconds, it can be increased to 40 seconds or reduced.
- **B. Changing the number of repetitions:** Performing an exercise multiple times, such as repeating a 30-second jump rope exercise five times.

#### **3.8.1 - Changing Rest Intervals:**

Examples include:

• A. Adjusting rest time between exercises: Increasing or decreasing the rest period between one exercise and the next or between exercise sets.

#### • **B. Changing the type of rest:** Using passive or active rest or a combination of both.

A coach may modify one element while keeping the others constant, such as adjusting exercise intensity while maintaining the number of repetitions and rest duration. Alternatively, two elements can be changed while keeping the third constant, such as increasing speed and duration while maintaining rest time. Some experts recommend altering only one element at a time while keeping the others fixed to ensure effective load regulation. (*Mohamed Hassan Allawi, 1990, pp. 57-59*)

#### 9.1 - The Relationship Between Load and Adaptation:

For adaptation to occur—an essential process for young athletes—the given load must be appropriate for each individual. Adaptation does not occur if the load is too low to stimulate physiological responses in the body.

For adaptation to take place, the load must reach the upper limit of the athlete's capacity to provide sufficient stimulation to the body's vital systems. The body's adaptation depends on how the load is structured:

- A high-volume, moderate-intensity load enhances endurance.
- A high-intensity, moderate-volume load improves speed and strength.

Adaptation is the result of a proper balance between training load and rest, which are viewed as a single unit.

During a training session, repeated application of the load depletes the athlete's energy and impacts their vital body systems, leading to functional fatigue—a point at which training should stop. The body then begins the adaptation process, which is completed during the recovery phase. This is followed by the compensation phase, and then supercompensation, which occurs as a result of the athlete reaching functional fatigue. (*Saleh Mohamed Saleh Mohamed*, 2017, pp. 70-71)

#### **Cours 6: Intensity in Sports Training**

#### **Intensity in Sports Training**

In a previous lecture, we discussed intensity as one of the fundamental components of training load. In this lecture, we will explore in detail the methods for determining or measuring training intensity in sports.

#### **First: The Concept of Training Intensity**

- It is the degree of neuromuscular effort exerted by the athlete during the execution of an exercise or movement within a specific timeframe. (Saleh Mohammed Saleh Mohammed, 2017, p. 49)
- The intensity of a single training load is defined as "the degree of difficulty or force characteristic of performing the executed exercise."
- Exercise intensity reflects the difficulty of execution, ranging from maximum intensity (difficulty) to gradually decreasing until reaching the lowest level of difficulty (intensity). Naturally, there are various levels between the maximum and minimum intensity. (Mufti Ibrahim Hamad, 2010, p. 67)

#### Second: Methods of Measuring (Determining) Intensity in Sports Training

#### 1. Determining Intensity by Time

For running or jogging over different distances, intensity is calculated based on the performance time required to complete a specific distance. This is determined using the best recorded achievement for that distance, applying the following formula:

## **Required effort (intensity) = Athlete's best score** × 100 / Chosen intensity (%)

**Example:** If a long-distance runner can cover a distance of **10,000 meters** in **40 minutes** as their maximum intensity (100% capacity), the required time to cover the same distance at **85% intensity** is calculated as follows:

Required effort (intensity) = 40 minutes  $\times$  100 / 85% = 47.5 minutes

In other words, the runner will complete 10,000 meters at 85% intensity in 47.5 minutes.

#### 2. Determining Intensity by Resistance

For strength training using weights, intensity is calculated based on the best possible single repetition maximum (1RM) in a given exercise. The following formula is used:

## (Desired intensity (%) × Best performance in each exercise) / 100 = Specific intensity when using the required weight.

**Example:** If an athlete can perform a **squat** (**deadlift**) with a maximum weight of **200 kg** for one repetition (representing 100% intensity), and the coach instructs the athlete to perform the exercise at **70% intensity**, the appropriate weight is calculated as follows:

Required weight at 70% intensity =  $200 \times 70 / 100 = 140$  kg

Thus, the athlete should lift **140 kg** to train at **70% intensity**. (Graduate Students, College of Physical Education and Sports Sciences, 2015, pp. 5-6)

#### **3.2- Determining Intensity by Distance**

For training in throwing or jumping events in athletics at various distances, the intensity of performing a specific exercise is calculated by identifying the best achievement for each distance that can be performed once in jumps or throws, using the following formula:

(Desired intensity (%)  $\times$  Athlete's best number) / 100 = Required intensity (or distance)

(Graduate Students, College of Physical Education and Sports Sciences, 2015, p. 6)

#### 4.2- Determining Targeted Load Intensity Using Heart Rate

Due to the ease of measuring heart rate, it has been practically used to regulate training loads, provide immediate feedback on the suitability of the load for the athlete's training condition and recovery period, regulate rest intervals during interval training, and determine the appropriate load intensity based on heart rate. (*Abu Alaa Ahmed Abdel Fattah & Ahmed Nasr El-Din Sayed, 1993, p. 261*)

#### A- Determining Load Intensity Using Maximum Heart Rate (MHR)

This method is used to obtain the target heart rate as an indicator of the required training intensity by determining its percentage relative to the athlete's maximum heart rate. It should be noted that there is only one variable in this method that determines the intensity of the physical exercise, which is the **maximum heart rate**. It can be calculated using the

following formula: (Graduate Students, College of Physical Education and Sports Sciences, 2015, p. 6)

 Table (1): Determining Physical Load Intensity Based on Heart Rate (According to

 Zatsiorsky, 1978)

Heart Rate (beats per minute)	Physical Load Intensity Levels
More than 180 bpm	Maximum
166 - 180 bpm	Submaximal
151 - 165 bpm	Above Average
131 - 150 bpm	Average
Less than 130 bpm	Low

(Source: Abu Alaa Ahmed Abdel Fattah & Ahmed Nasr El-Din Sayed, 1993, p. 263)

## Example

If an athlete's maximum heart rate during physical effort (load) is **195 bpm**, and you want to assign a load that equals **70%** of their maximum intensity,

**Required:** Calculate the target heart rate corresponding to **70% intensity** 

## Solution:

Using the formula:

Target heart rate at 70% load =  $195 \times 70 / 100 = 137$  bpm

Thus, for the exercise load to equal **70% intensity**, the athlete's heart rate must be raised to **137 bpm**.

#### **B-** Athlete's Age Method

Regulating intensity through heart rate based on the athlete's age in years follows the two equations below:

## Maximum heart rate for any athlete = 220 – Age

(Desired intensity × Maximum heart rate) / 100 = Required heart rate (in bpm)

#### **Example:**

A **20-year-old** athlete is training at **80% intensity** of their maximum effort. **What is their heart rate at this intensity?** 

#### Solution:

**Calculation of maximum heart rate:** 220 - 20 = 200 bpm

**Calculation of target heart rate:**  $(80 \times 200) / 100 = 160$  bpm (*Graduate Students, College of Physical Education and Sports Sciences, 2015, pp. 6-7*)

#### C- Karvonen Method (Karvonen, M.)

Karvonen developed a method named after him, which involves calculating the Heart Rate Reserve (HRR)—the difference between the maximum heart rate during exercise and the resting heart rate.

#### **Example:**

An athlete has a **maximum heart rate** of **203 bpm** during physical exertion and a **resting heart rate** of **63 bpm**.

#### Heart Rate Reserve (HRR) = Maximum Heart Rate – Resting Heart Rate

Thus, their Heart Rate Reserve (HRR) is:

203-63=140 bpm203 - 63 = 140 This HRR represents the **reserve of maximum heart rate**.

The required exercise intensity for the athlete can be expressed through the **Target Heart Rate** (**THR**) as an indicator of intensity. It is determined as a percentage of the HRR. For example, at **80% intensity**, the target heart rate can be calculated as follows:

Using the equation:

## Target Heart Rate = (Maximum Heart Rate Reserve × Target Heart Rate Percentage / 100) + Resting Heart Rate

Thus, the **exercise intensity at 80%** for this athlete corresponds to a **heart rate of 175 bpm**. (*Mufti Ibrahim Hammad, 2008, p. 67*)

#### **Divisions of Intensity in Sports Training**

There are several classifications of intensity, including the following:

#### Table (2): Intensity Classifications (Percentage-Based %)

Matveev's Classification (Russia)	Harre's Classification (Germany)
<b>30 - 50%</b> Low Intensity	<b>30 - 50%</b> Simple or Low Intensity
50 - 70% Light Intensity	50 - 70% Below Average Intensity
70 - 80% Moderate Intensity	70 - 80% Moderate Intensity
80 - 90% Submaximal Intensity	80 - 90% Near-Maximal Intensity
90 - 100% Maximal Intensity	90 - 100% Maximal Intensity
-	100 - 105% Supra-Maximal Intensity

(Source: Graduate Students, College of Physical Education and Sports Sciences, 2015, p. 8)
## Cours 7 (Two Sessions): Methods and Approaches in Sports Training

#### Methods for Developing Physical Attributes (Sports Training Methods)

There are multiple methods for training physical attributes (physical preparation methods), which can be classified based on the way "load" and "rest" are used into the following methods:

- Continuous Load Method (Sustained Load), also known as the continuous or regular method.
- Interval Training Method.
- Repetition Training Method.
- Circuit Training Method.

Each of these methods has its own objectives, effects, and characteristics, which coaches must thoroughly understand to effectively develop and enhance the essential physical attributes of athletes to the highest possible level.

## 1- Continuous Training Method (Duration Method / Continuous Training Method)

## **A-Objectives**

The primary goal of using the continuous training method (sustained load) is to develop and enhance general endurance (cardiorespiratory endurance).

## **B-Effects**

## • Physiological Effects:

- Enhances the efficiency of the cardiovascular and respiratory systems.
- Increases the blood's capacity to transport more oxygen and nutrients.
- Significantly improves the body's ability to adapt to sustained physical exertion.

## • Psychological Effects:

• Enhances perseverance and the ability to endure continuous exertion.

• Develops strong willpower, which is essential for excelling in sports, particularly in endurance-based activities. (Mohamed Hassan Allawi, 1990, p. 213)

## **C-** Characteristics

- Exercise Intensity: Ranges between 25% 75% of the individual's maximum capacity.
- **Exercise Volume:** The method is characterized by an increased training volume, achieved through longer durations or higher repetitions.
- **Rest Periods:** Exercises are performed continuously without breaks.

Examples:

- **Example 1:** Increasing exercise intensity (e.g., running or swimming the same distance but at a higher speed).
- Example 2: Increasing the distance (e.g., running 3 km instead of 2 km) or extending the duration (e.g., swimming for 45 minutes instead of 30 minutes). (*Mohamed Hassan Allawi, 1990, pp. 214-215*)

## **2- Interval Training Method**

This method is characterized by alternating between exertion and rest, meaning that training involves successive cycles of workload and recovery. It is widely used in most sports to develop endurance, muscle strength, and speed, as well as combined physical attributes like speed endurance, strength endurance, and explosive strength (power-speed).

Modern interval training is divided into two types based on load intensity and their effects on physical development: Extensive Interval Training (Low-Intensity Interval Training) Characterized by high training volume and low intensity. Intensive Interval Training (High-Intensity Interval Training - HIIT) Characterized by high intensity and low volume. (*Mohamed Hassan Allawi, 1990, pp. 217-218*)

#### **1.2 - Extensive Interval Training Method**

## A. Objectives:

This method aims to develop the following physical attributes:

• General endurance (cardiorespiratory endurance)

- Specific endurance
- Strength endurance

## **B. Effects:**

- Enhances metabolic efficiency in muscles (cellular oxidation).
- Strengthens lung walls and veins by improving lung vital capacity and heart capacity, as well as increasing the blood's ability to carry more oxygen (O<sub>2</sub>).
- Develops an individual's ability to adapt to physical exertion, which delays the onset of fatigue.

## **C. Characteristics:**

- Exercise Intensity: Medium-intensity exercises, with running exercises reaching approximately 60% to 80% of an individual's maximum capacity, while strength exercises range between 50% to 60% of maximum capacity. (Mohamed Hassan Allawi, 1990, p. 218)
- Exercise Volume: Exercise duration varies from 14 to 90 seconds in running and 15 to 30 seconds for strengthening exercises using additional weights or body weight.
- Rest Periods: Short rest periods between exercises, ranging from 45 to 90 seconds for advanced athletes and 60 to 120 seconds for beginners. (Mohamed Hassan Allawi, 1990, p. 219)

## **Examples of Training Exercises:**

A. Running Events for Track and Field Athletes (Under 18 years old):

Running Distance (m)	Running Speed (s)	Rest Interval (s)	Repetitions
100m	17-20 sec	60-100 sec	10-12 times
200m	38-42 sec	90-120 sec	8-12 times
300m	54-60 sec	90-120 sec	6-8 times
400m	80-100 sec	90-150 sec	5-7 times

Athletes should apply active rest during recovery periods, such as walking or stretching exercises.

To progress in this training method, athletes should either:

- Gradually reduce the rest period between exercises.
- Increase the number of repetitions.

However, increasing running speed should be avoided to prevent the method from becoming high-intensity interval training.

## **B. Strength Training Exercises:**

These exercises use additional weights or the athlete's own body weight to develop strength endurance through a progressive increase in repetitions.

For example, in the inclined push-up exercise to develop strength endurance in the arms and shoulders:

- 1. 10 repetitions, followed by 60-90 seconds rest.
- 2. 12 repetitions, followed by 60-90 seconds rest.
- 3. 20 repetitions, followed by 60-90 seconds rest.
- 4. 30 repetitions, followed by 60-90 seconds rest.

Active rest should be applied during breaks using relaxation exercises. (Mohamed Hassan Allawi, 1990, pp. 220-221).

## 2.2 - Intensive Interval Training Method

## A. Objectives:

This method aims to develop the following physical attributes:

- Specific endurance (strength endurance, speed endurance).
- Speed.
- **Power-speed combination** (explosive strength or muscle power).
- Maximum strength, up to a certain degree.

## **B.** Effects:

- The muscles work under **oxygen deficiency** or **oxygen debt** due to high-intensity exertion, leading to the accumulation of lactic acid.
- Improves the muscle's ability to adapt to strenuous exertion, which delays the sensation of fatigue.

## C. Characteristics:

- Exercise Intensity: High-intensity exercises, with running exercises reaching 80% to 90% of an individual's maximum capacity, and strength exercises up to 75% of the maximum capacity.
- **Exercise Volume:** Shorter exercise duration due to increased intensity (**10-30 seconds** for both resistance training and running exercises).
- **Rest Periods:** Due to the increased intensity, rest intervals are **relatively longer**, ranging from **90-180 seconds** for advanced athletes and **110-240 seconds** for beginners.
- Active Rest: Must be used between rest periods, ensuring that the heart rate does not drop below 110-120 beats per minute. (Mohamed Hassan Allawi, 1990, pp. 222-223).

## **Examples of Some Exercises Used:**

## A- Using Running Exercises for Track and Field Athletes:

Especially for young athletes under 18 years old, as follows:

Running Distance (m)	Running Speed (s)	Rest Interval (s)	Number of Repetitions
100m	14-18s	90-120s	6-8 times
200m	36-38s	120-180s	6-8 times
300m	52-54s	120-180s	4-6 times
400m	75-95s	180-300s	4-5 times

It is important to apply the principle of active rest during the rest intervals by using walking, stretching, or relaxation exercises.

Training load progression can be achieved by either reducing the rest intervals, increasing running speed, or increasing the number of repetitions by one or two.

## **B-** Using Strength Training Exercises:

This method can involve bodyweight exercises or additional weights amounting to half to two-thirds of the athlete's body weight, or approximately 75% of the individual's level.

- The same exercise should not be repeated more than **10 times**, performed **quickly and correctly**.
- Each exercise should be followed by a rest interval of about 60 seconds, during which stretching and relaxation exercises are performed.
- To **progressively increase training load**, rest intervals can be shortened or performance speed can be increased.
- Avoid increasing the number of repetitions per exercise, as this would reduce the method's effectiveness. (*Mohamed Hassan Allawi, 1990, pp. 223-224*).

## **3-Repetitional Training Method:**

## **A- Objectives:**

This method primarily aims to develop **physical attributes**, such as:

- **Speed:** Movement speed;
- Maximum Strength (Peak Strength);
- Strength Characterized by Speed;
- It can sometimes be used to **develop specific endurance**, such as speed endurance.

## **B- Effects:**

- It impacts various body systems and organs, particularly the nervous system, leading to rapid central fatigue.
- It causes **high oxygen debt** due to the **intensity of exercises**.
- It **depletes energy stores** and **accumulates lactic acid** in the muscles, reducing the athlete's ability to sustain performance.

## **C- Characteristics:**

- Exercise Intensity: High intensity, not less than 80-90% of the athlete's maximum capacity, sometimes reaching 100%.
- Exercise Volume:
  - Short duration and **low number of repetitions** (e.g., **1-3 repetitions** for running).

- For weightlifting exercises: **20-30 lifts per session**, or **3-6 sets**.
- Rest Intervals:
  - For running exercises: **10 to 45 minutes**.
  - For strength exercises: **3-4 minutes**, with **active rest** (stretching and relaxation exercises).

(Mohamed Hassan Allawi, 1990, pp. 225-226).

## **Examples of Some Exercises Used:**

## **A- Running Exercises:**

- Uses the actual running distance the sprinter specializes in (100m, 200m, or 400m).
- Running speed should be **slightly below the maximum**, with **2-3 repetitions**, followed by a **30-45 minute rest interval**. **Examples:**
- 100 m sprint at approximately 90% of the athlete's maximum speed, repeated 2-3 times, with 30-45 minutes of rest between repetitions.
- 200 m sprint at approximately 90% of the athlete's maximum speed, repeated 2-3 times, with 30-45 minutes of rest between repetitions.
- 400 m sprint at approximately 90% of the athlete's maximum speed, repeated 1-3 times, with 30-45 minutes of rest between repetitions.
- Active recovery should be incorporated during rest intervals, such as performing light jogging or muscle relaxation exercises.

## **B-** Weight Training Exercises:

- Uses weights reaching **90% of the athlete's max level** (sometimes 100%).
- Each exercise should be performed **only 1-2 times**, or repeated **3-6 times per set**.
- Rest between repetitions: 3-4 minutes, with active rest (stretching and muscle relaxation). (*Mohamed Hassan Allawi, 1990, pp. 226-227*).

## 4- Circuit Training Method:

Morgan and Adamson from the University of Leeds in England are credited with establishing the foundations of this method in 1957. Currently, many scientists believe that circuit training is not a specific training method distinguished by unique characteristics that set it apart from other training methods, such as continuous training, interval training, or repetitive training. Rather, it is an organizational approach to performing exercises, following specific conditions regarding exercise selection, sequencing, repetition count, and intensity. It can be structured using the principles and foundations of any of the aforementioned training methods. Circuit training consists of a number of exercises ranging from 4 to 15 per training session, sometimes even more.

## **A- Objectives:**

Circuit training aims to develop and enhance muscle strength, speed, endurance, and composite physical attributes such as speed endurance, strength endurance, and strength characterized by speed. (Mohamed Hassan Allawi, 1990, pp. 229-230).

## **B- Effects:**

It improves the efficiency of the body's functional and physiological systems and enhances composite attributes.

## **C- Characteristics:**

Key characteristics of circuit training include:

- The training dose is determined either by repetition count or a specific time duration.
- Determining the maximum repetitions for each type of exercise.
- Rest periods between exercises or no rest at all. (<u>www.lamya.yoo7.com/t374-topic</u>).

## 1.4- Types of Exercises Used in Circuit Training:

Among the exercises that can be used in circuit training are the following:

- Exercises that utilize body weight resistance, as well as partner-assisted exercises.
- Exercises using various weights (such as dumbbells or iron balls).
- Exercises with sandbags and medicine balls of different sizes and weights.
- Exercises on gymnastics equipment, such as hanging, climbing, and various swings.
- Exercises using simple tools and equipment found in the environment, such as stones, wood, or trees, etc. (Mohamed Hassan Allawi, 1990, p. 232).

**Note:** The trainer can determine the appropriate dose for each exercise in the training circuit by dividing the maximum achieved repetitions of each exercise. This is done by dividing the total repetitions by 2 for advanced trainees, while for beginners or during physical education

classes, the maximum recorded repetitions are divided by 3 or 4. (Mohamed Hassan Allawi, 1990, p. 235).

## 2.4- Advantages of Circuit Training:

- A crucial method for improving cardiovascular and respiratory system efficiency, increasing endurance, and adapting to physical exertion.
- Significantly contributes to the development of muscle strength, speed, and endurance, as well as composite physical attributes such as strength endurance, speed endurance, and strength characterized by speed.
- Can be structured using any of the previously mentioned training methods.
- Allows exercises to be selected and structured in a way that develops motor skills, strategic abilities, and fundamental physical attributes.
- Each individual can practice training at a dosage that matches their current level.
- Enables the use of record-keeping cards to track player progress, helping athletes assess their level and motivating them to improve and advance.
- Allows for the use of various types of exercises based on available resources.
- Features an element of excitement, variation, and motivation.
- Significantly contributes to developing moral and willpower traits such as discipline, honesty, and self-reliance.
- Helps in understanding individual differences among athletes. (Mohamed Hassan Allawi, 1990, pp. 232-233).

#### **Cours 8 (Four Sessions): Sports Training and Physical Attributes**

#### **Sports Training Science and Physical Attributes:**

There is a difference of opinion among scholars and researchers regarding the terminology, with some referring to it as "physical attributes," others as "physical fitness components," and others still as "physical preparation elements." All these terms essentially mean the same thing. The term "physical fitness" is used as an indicator of an individual's level of physical preparation by assessing the development of their physical and motor abilities. Physical fitness, as one aspect of overall fitness and a manifestation of it, is considered a means rather than an end in itself, aiming for the overall well-being of the individual. (Mohamed Lotfi El-Sayed & Wagdy Mostafa El-Fateh, 2014, p. 140)

The concept of physical fitness has emerged under different terminologies, including physical capabilities, and has been given various terms based on different perspectives and beliefs. It has been referred to as physical attributes, physical components, and physical fitness elements. (Mohamedat Rachid & Loukia Youssef Islam, 2016, p. 24)

Scholars in physical education and sports from the Soviet Union and the Eastern Bloc refer to these as "physical" or "motor attributes" to describe human motor or physical capacities. Meanwhile, physical education scholars in the United States refer to them as "physical fitness components," considering them as part of the overall fitness of an individual, which includes social, psychological, and emotional components. However, both schools agree that these attributes have components, though they differ on some elements. (Mahmoud Awad Bassiouni & Faisal Yassin Al-Shati, 1992, p. 158)

#### **Physical Fitness Elements and Their Development Methods:**

Some believe that the goal of an athlete's physical preparation is to achieve physical fitness. In reality, using the term "physical fitness" in sports training raises many questions and may lead to ambiguity in defining physical preparation. This is because the concept of physical fitness is widely debated and difficult to define. The disagreement arises from the varying philosophical perspectives held by sports science scholars across different countries.

Others believe that physical preparation involves developing the essential and necessary physical attributes of an athlete. According to this view, physical preparation is divided into **general physical preparation** and **specific physical preparation**. (Mohamed Hassan Allawi, 1990, p. 79)

#### **Definition of Physical Fitness:**

The definitions of physical fitness, its interpretation, and its components vary. It is defined as: "The healthy condition of an athlete in terms of their physical efficiency, enabling them to perform physical and motor activities skillfully and efficiently, with optimal performance and minimal effort."

Physical preparation and physical fitness are closely linked, as physical fitness is considered a means to achieve physical preparation. Therefore, physical fitness serves as an indicator of an individual's level of physical preparation. (Mufti Ibrahim Hamad, 2008, p. 143)

#### **A- General Physical Preparation (PPG):**

This refers to equipping an athlete with general and balanced physical attributes (elements), including endurance, muscular strength, speed, agility, flexibility, balance, accuracy, and coordination. General physical preparation forms the foundation upon which specific physical preparation is built. (Mufti Ibrahim Mohamed, 1998, p. 340)

#### **B- Specific Physical Preparation (PPS):**

This focuses on developing the physical attributes essential for a particular sport in which the athlete specializes, ensuring their continuous improvement to reach the highest athletic levels.

During the period of specific physical preparation, the development of necessary physical attributes is closely tied to the development of motor skills. An athlete cannot master the fundamental motor skills required for their specialized sport if they lack the necessary physical attributes. (Mohamed Hassan Allawi, 1990, pp. 80-81)

At its core, physical preparation consists of exercises given to athletes to help them reach the highest possible level in essential physical fitness elements required for their sport. Physical, skill-based, and tactical performance heavily depends on the athlete's physical efficiency and the development of their physical attributes. Regardless of how skilled a player is in game strategies, they cannot execute them effectively in a match without high physical fitness.

Some of the key physical attributes include: Endurance, Speed, Muscular strength, Flexibility, Agility, Balance, Accuracy, Coordination.

## **Cours 9: Physical Attributes and Their Development**

#### 1. Endurance

Other terms for endurance include persistence, stamina, resilience, cardiovascular endurance, and basic endurance. Endurance is one of the fundamental physical attributes essential for all athletes, particularly those engaged in sports requiring prolonged physical effort. It is the first and most crucial physical attribute to be developed at the beginning of the sports season, serving as the solid foundation upon which other physical attributes are built.

- **Matveev's Definition:** Endurance is defined as "the ability to resist fatigue in any activity for the longest possible time" (Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 186).
- Other Definitions: Some scholars define endurance as an athlete's ability to maintain effective performance without a decline in efficiency (Mufti Ibrahim Hammad, 2008, p. 147).

#### 2. Types of Endurance

Endurance is classified into two main types:

## **2.1 General Endurance**

This refers to the ability to perform activities using large muscle groups for extended periods at a moderate or above-moderate level of intensity, with the cardiovascular and respiratory systems functioning efficiently. It is also known as basic endurance or cardiovascular endurance (Mohamed Hassan Allawi, 1990, pp. 173-174).

#### 2.1.1 Developing General Endurance

General endurance forms the basis for specific endurance. Exercises for general endurance are introduced at the beginning of the physical preparation phase but do not last long, as they gradually give way to specific endurance training. Consequently, general endurance is allocated less time in training programs, while specific endurance receives more focus (Mufti Ibrahim Mohamed, 1998, p. 341).

The primary method for developing general endurance involves using moderateintensity exercise over an extended duration. To achieve this, running in fields, mountainous areas, forests, or deserts is recommended. Cross-country running in oxygen-rich, grassy areas with soft terrain is particularly beneficial (Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 192).

General endurance can be developed using the **continuous load method**, **interval training method**, and **circuit training method** (Mohamed Hassan Allawi, 1990, p. 177).

- **Continuous Training Method:** This method involves long-distance running at a moderate speed for an extended period without rest. When training for general endurance, the following load components should be considered:
  - **Intensity:** Moderate; for example, running speed should be below average or moderate, with increasing distance and obstacles gradually.
  - **Volume:** The exercise should last relatively long, with an increasing running distance and repetitions. For instance, a 5000-meter run can be divided into four 1250-meter repetitions.
  - Rest Periods: The recovery time between repetitions should be relatively long, appropriate for the athlete's age and fitness level. Typically, a small portion of the rest period is passive recovery, while most of it is active recovery (Mufti Ibrahim Mohamed, 1998, pp. 341-342).
- **Interval Training Method:** This method is particularly effective for improving heart function and circulation. "Reindel" suggests the following principles when using interval training to develop general endurance:
  - Each exercise session should last between **15-60 seconds**.
  - The rest period between exercises should range from **30-90 seconds**.
  - The total load should be adjusted according to the individual's fitness level and training phase (preparatory period, competition period, or transitional period).
  - The workload should not be repeated if the heart rate does not drop to approximately 120 beats per minute at the end of the rest period between sets (Mohamed Hassan Allawi, 1990, pp. 177-178).

## **General Endurance Training Models During the Preparation Period:**

- 1.  $1500m \times 3$  times Running speed below average Rest interval: 5 minutes.
- 2.  $1500m \times 3$  times Moderate running speed Rest interval: 5 minutes.

- 3.  $2000m \times 2$  times Moderate running speed Rest interval: 8 minutes.
- 4.  $1500m \times 4$  times Moderate running speed Rest interval: 4 minutes.
- 5.  $2500m \times 2$  times Moderate running speed Rest interval: 12 minutes.
- 1 × 1500m Rest: 5 minutes, then 1 × 1000m Rest: 4 minutes, then 1 × 2000m Moderate running speed.
- 7.  $1 \times 2000m$  Rest: 8 minutes, then  $1 \times 800m$  Rest: 3 minutes, then  $1 \times 1000m$  Moderate running speed.

#### 2.2 – Specific Endurance:

It refers to the ability to maintain effective physiological efficiency under physical performance conditions in a specific type of sport. It is generally divided into: Speed endurance, Strength endurance, and Performance endurance. (*Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 187*).

#### **2.2.1 – Speed Endurance:**

Speed endurance is a combination of endurance and speed, meaning "the ability to sustain repeated bursts of speed."

### A. Developing Speed Endurance:

It is preferable to use the interval training method for developing speed endurance. Speed endurance exercises should be gradually introduced, replacing general endurance exercises after athletes' bodies have adapted.

## 1. Low-Intensity Interval Training for Speed Endurance:

Once athletes have adapted to general endurance training, low-intensity interval training is introduced with the following workload components:

- Intensity: 70–80% of the athlete's maximum speed.
- Volume:
  - Each exercise lasts between 200m to 400m.
  - Each session consists of **4 to 6 repetitions**.
- **Rest interval between repetitions:** 40 seconds to 2 minutes.
- 2. High-Intensity Interval Training for Speed Endurance:

High-intensity interval training follows low-intensity training and is later used alternately. The workload components are:

- Intensity: 80–90% of the athlete's maximum speed.
- Volume:
  - Each repetition ranges from **20m to 200m**.
  - Total repetitions: 6 to 20 times.
- Rest interval between repetitions: 20 to 90 seconds (active rest should be included).

## **B. Speed Endurance in the Annual Training Plan:**

Speed endurance training should be introduced gradually after an adequate period of general endurance training. Initially, low-intensity interval training is used, featuring:

- Longer running distances,
- Lower speeds,
- Longer rest intervals between repetitions.

Over time, low-intensity interval training transitions to high-intensity training, characterized by:

- Shorter running distances,
- Gradually increasing speed,
- Shorter rest intervals between repetitions.

## C. Examples of Speed Endurance Workouts (Considering the Mentioned Load Components):

- 1.  $(400m \times 4 \text{ times})$  Running speed: 70–80% of max Rest: 90 sec to 2 min.
- 2.  $(300m \times 4 \text{ times})$  Running speed: 70–80% of max Rest: 80–110 sec.
- 3.  $(600m \times 6 \text{ times})$  Running speed: 70–80% of max Rest: 90 sec to 2 min.
- 4. Mixed Repetition Workout:
  - $\circ$  (300m × 1 time) Running speed: 70–80% of max Rest: 80–110 sec.
  - $\circ$  (400m × 1 time) Running speed: 80–90% of max Rest: 90 sec to 2 min.

- $\circ$  (200m × 1 time) Running speed: 70–80% of max Rest: 80–100 sec.
- $\circ$  (300m × 1 time) Running speed: 70–80% of max Rest: 90 sec to 2 min. (*Mufti Ibrahim Muhammad, 1998, pp. 354-356*).

#### **2.2.2- Strength Endurance:**

It is a composite trait of endurance and strength, defined as the body's ability to resist fatigue during continuous exertion characterized by long durations and associated with levels of muscular strength (...). Some researchers prefer to use the term "muscular strength and muscular endurance" as an alternative to "strength endurance." From their perspective, it means: "an individual's ability to sustain repetitive effort while resisting external loads on the engaged muscle groups" (Mohamed Hassan Allawi, 1990, p. 100).

**Note:** Some consider strength endurance as one of the components of endurance rather than a component of muscular strength.

#### **A- Developing Strength Endurance:**

To develop strength endurance, the number of repetitions and sets of exercises should be increased, with a medium-intensity load and reduced rest periods. Both low-intensity interval training and circuit training are used to enhance strength endurance. The training load components should be as follows:

- Load Intensity: Resistance equivalent to 50-70% of the player's maximum capacity.
- Load Volume:
  - Duration of a single exercise: 20-30 repetitions.
  - Number of sets per exercise: 4-6 sets.
- **Rest Periods Between Repetitions:** Incomplete rest periods (approximately 1-2 minutes).

#### **B-** Strength Endurance in the Annual Training Plan:

Strength endurance exercises should begin in the second week of the general preparation phase, ensuring that they comprehensively target all muscle groups. The initial intensity and number of repetitions should be low, with gradual increases as training progresses. Strength endurance development continues throughout the year, except during the transition and recovery periods, depending on the team's conditions (Mufti Ibrahim Mohamed, 1998, pp. 369-370).

#### **C- Examples of Strength Endurance Exercises During the General Preparation Period:**

- Standing back-to-back with a partner and passing a 4kg medicine ball overhead and between the legs.
- Running 150m while exchanging a medicine ball with a partner.
- Continuous rope skipping while lifting the knees high.

## **D-** Examples of Strength Endurance Exercises During Friendly Matches and Competition Periods:

A circuit training model with 8 stations:

- 1. Inclined push-ups.
- 2. Medium-speed running between two markers, followed by a burpee, repeated continuously.
- 3. Jumping over a hurdle and then passing under it.
- 4. Stepping onto a box with arms raised high, then stepping down and repeating.
- 5. Lying down, raising the torso and extended legs to touch a medicine ball with the feet.
- 6. Standing while lifting a weight overhead, followed by a half squat.
- 7. Lying on a box, supporting the heels on a wall bar, bending the torso forward and backward.
- 8. From a squat position, jumping into a fully extended position, then returning to the squat.

## **3.2.2- Performance Endurance (Work Endurance):**

This refers to the ability to repeatedly perform motor skills over relatively long periods with good coordination, such as performing complex gymnastics movements (Mohamed Hassan Allawi, 1990, p. 176).

It is also defined as the player's ability to repeatedly execute technical and tactical movements with precision and vitality throughout a match. Some consider performance endurance to be a combination of strength endurance, speed endurance, power-speed endurance, agility, flexibility, coordination, and precise execution of technical and tactical skills (Mufti Ibrahim Mohamed, 1998, p. 344).

## **A- Developing Performance Endurance:**

Both interval training and circuit training are used to develop performance endurance. When using low-intensity interval training (aerobic training), which is gradually introduced as an alternative to continuous training after the players' bodies have adapted to general endurance, the training load components should be as follows:

- Load Intensity: 60-80% of the player's maximum capacity, with a heart rate of 160 bpm.
- Load Volume:
  - $\circ$  Duration of a single exercise: 90 seconds 2.5 minutes.
  - Number of sets per exercise: 3-6 sets.
- **Rest Periods Between Repetitions:** Incomplete rest until the heart rate drops to 110 bpm.

When using high-intensity interval training (anaerobic training), which is gradually introduced after low-intensity interval training and then alternated with it, the training load components should be as follows:

- Load Intensity: 80-90% of the player's maximum capacity, with a heart rate of 180 bpm.
- Load Volume:
  - Duration of a single exercise: 30-60 seconds.
  - Number of repetitions per exercise: 3-6 times.
- **Rest Periods Between Repetitions:** Incomplete rest until the heart rate drops to 120 bpm.
- In the circuit training method, the number of stations ranges between 5-6 stations for skill performance, and the training load components are similar to those mentioned in the interval training method.

## **B- Endurance Performance in the Annual Training Plan:**

It is preferable to start endurance performance exercises after an appropriate period of general endurance training for the players. This usually begins at the end of the second week or during the third week, depending on the players' level (...). Gradually, endurance performance and

speed endurance should replace general endurance during the second and third weeks. After approximately the third week, endurance performance training can continue during the specific preparation period, during preparation for trial matches, and throughout the competition period (Mufti Ibrahim Mohamed, 1998, pp. 344-346).

# C- Sample Exercises for Endurance Performance in the Final Part of the General Preparation Period:

- Dribbling the ball with the right and left foot using the inside and outside of the foot for 1.5-2 minutes, then repeating the exercise.
- Zigzag dribbling within a designated area for 50 seconds, then repeating the exercise.
- Zigzag dribbling in two separate squares, where players switch from one square to another upon signal, for 50 seconds, then repeating the exercise.
- Lifting the ball from the ground using one or both feet, tossing it high, and controlling it with different body parts continuously for 1-1.5 minutes, then repeating the exercise (Mufti Ibrahim Mohamed, 1998, p. 346).

## **Developing Endurance in Young Athletes:**

The old perspective that insisted young athletes should only engage in speed-based sports and avoid endurance-based activities no longer has strong support. Observations show that children naturally engage in play for extended periods, followed by rest, before resuming activity again.

There are several important considerations that sports coaches must keep in mind when training young athletes for endurance. The key considerations can be summarized as follows:

- 1. It is preferable to start endurance training for young athletes as early as possible to ensure proper physical development.
- 2. Endurance training should be comprehensive and well-balanced. Small games and sports like football and handball serve as essential endurance-building exercises and can be practiced year-round.
- 3. Speed training should not be overly emphasized during endurance training.
- 4. Training loads should be managed in intervals, and practice should have a recreational aspect that aligns with the psychological characteristics of young athletes.

- 5. Endurance sports should be used to develop both speed endurance and running endurance in young athletes (Mohamed Hassan Allawi, 1990, p. 185).
- 6. Intensive endurance training should be followed by at least one or more rest days.
- 7. The goal of endurance training for young athletes is not to achieve high records or championships but to prepare them for greater endurance in later years.
- 8. Regular medical check-ups should be conducted for young athletes engaged in endurance training, with special attention to monitoring heart function.

It is essential to recognize that endurance training places significant demands on various bodily systems, such as the nervous system, respiratory system, and circulatory system. Therefore, long-term planning for endurance training is crucial to prevent injuries such as heart conditions and tissue damage (Mohamed Hassan Allawi, 1990, p. 186).

#### Second - Speed (Speed):

- It is defined as "the ability to achieve movement in the shortest possible time."
- It refers to an individual's ability to perform consecutive movements of the same type in the shortest duration, such as covering a distance between two points in the least possible time (Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 180).

## **1.2 Types of Speed:**

There are three types of speed:

- A- Transitional Speed (Sprinting)
- **B- Performance or Movement Speed**
- C- Reaction Speed (Response Time)

#### A- Transitional Speed (Sprinting):

It refers to the ability to move from one place to another at maximum speed, meaning covering a specific distance in the shortest time possible. An example of this is sprinting over a defined distance.

#### **B-** Performance Speed (Movement Speed):

It is the speed of muscle contraction or a specific group of muscles when performing isolated movements, such as kicking a ball or jumping, as well as when performing complex movements, such as receiving and passing the ball (Mohamed Hassan Allawi, 1990, pp. 152-153).

This refers to executing a movement or a series of combined movements in the shortest time possible. Examples of single movements include shooting, passing, or ball control in the least amount of time. In compound movements, it includes actions like controlling the ball and then passing it as quickly as possible (Mufti Ibrahim Mohamed, 1998, p. 378).

#### C- Reaction Speed (Response Time):

It is the ability to respond to a specific stimulus in the shortest possible time (Mohamed Hassan Allawi, 1990, p. 153).

Physiologically, reaction speed is "the time interval between the appearance of a stimulus and the response to that stimulus." There are two types of reaction speed: simple reaction and complex (discriminative) reaction.

- 1. **Simple Reaction Time:** This is the time between the appearance of a single known stimulus and the moment of response to it. Examples include the start of sprint or swimming competitions.
- Complex (Discriminative) Reaction Time: This occurs when multiple stimuli are present, and the athlete must respond to only one of them. The motor reaction in this case is referred to as a discriminative (complex) reaction. This type is common in many sports activities, including team sports and individual competitions (Abu Alaa Ahmed Abdel Fattah, Ahmed Nasr El-Din Sayed, 1993, p. 182).

## 2.2- Improving Speed

#### **1.2.2- Improving Transitional Speed (Sprinting)**

To improve transitional speed, the training load components should be as follows:

- Load intensity: The maximum sprinting speed a player can achieve.
- Load volume: The duration of a single sprint to cover a specific distance.
- **Repetition count:** Between 4 to 8 times or until fatigue appears.
- **Rest period between repetitions:** Until full recovery, usually between 30 seconds to 2 minutes for commonly used sprinting distances (10 to 30 meters).

#### A- Transitional Speed in the Annual Training Plan:

Transitional speed exercises start appearing after the second week and continue throughout the specialized preparation phase, match preparation (test matches), and competition period, depending on team conditions.

#### **B-** Examples of Sprint Exercises in the General Preparation Phase:

- 100m sprint Rest: 3-4.5 minutes. Repeat.
- 80m sprint Rest: 2.5-4 minutes. Repeat.
- 60m sprint Rest: 2-3.5 minutes. Repeat.

## C- Examples of Sprint Exercises in the Special Preparation Phase, Test Matches, and Competition Period:

- 50m sprint Rest: 2-3 minutes. Repeat.
- 40m sprint Rest: 1.5-2.5 minutes. Repeat.
- 30m sprint Rest: 1-2 minutes. Repeat.
- 20m sprint Rest: 50 seconds-1.5 minutes. Repeat.
- 10m sprint Rest: 30-50 seconds. Repeat. (Mufti Ibrahim Mohamed, 1998, pp. 379-380).

## 2.2.2- Improving Performance Speed (Movement Speed)

The training load components are nearly the same as in transitional speed (sprinting).

## A- Performance Speed in the Annual Training Plan:

Performance speed exercises should ideally begin in the late general preparation phase or early special preparation phase and continue throughout the match preparation period (test matches) and competition period as a key component.

**B-** Performance Speed Exercises from Late General Preparation and Special Preparation Phase:

- From a lying position, quickly rise and sprint 10, 20, or 30m in the shortest possible time. Repeat after rest.
- From a prone position, quickly rise and sprint 10, 20, or 30m in the shortest possible time. Repeat after rest.
- From lying on the back, lift the legs high, then quickly rise and sprint 10, 20, or 30m in the shortest possible time. Repeat after rest. These exercises can be performed with or without a ball.

## C- Performance Speed Exercises in Test Matches and Competition Period:

- Jump to hit an imaginary ball in the air, then land and sprint 10-20m. Repeat after rest.
- Run in place at maximum speed to perform as many steps as possible (5-8 seconds).
  Repeat after rest.
- From a standing position, drop to a prone position, rise twice, then sprint 10m in the shortest time. Repeat after rest.

## **3.2.2- Improving Reaction Speed (Response Time)**

## **A- Developing Simple Reaction Speed:**

It is recommended to repeatedly train conditional responses known in advance, such as hand or color signals, or by directing attention to sensory perceptions (auditory or visual).

## **B-** Developing Complex Reaction Speed:

Initially, training should involve two types of sensory stimuli (e.g., colored light signals) or using two different numbers. The response should involve a specific movement upon seeing a particular light signal. This type of training can be applied to fencing and tennis players, among others. (*Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 182*).

## **Third - Muscular Strength**

- "It is the ability of a muscle to overcome or resist an external resistance." (Mohamed Hassan Allawi, 1990, p. 91).
- "It is the capability or tension that a muscle or a group of muscles can produce against resistance in a single maximal voluntary contraction." (Mufti Ibrahim Hammad, 2010, p. 190).

## **1.3-** Types of Muscular Strength

There are three types of strength: maximal strength, speed-strength (explosive power), and strength endurance.

## 1.1.3- Maximal Strength

**Maximum Strength:** It is the highest force that the neuromuscular system can produce during a maximal voluntary contraction.

#### 2.1.3- Speed-Strength (Explosive Power)

**Explosive Power:** It is the ability of the neuromuscular system to overcome resistances that require a high degree of muscle contraction speed, such as spiking in volleyball. Therefore, speed-strength is considered a combination of muscular strength and speed. (Mohamed Hassan Allawi, 1990, p. 97).

#### **3.1.3- Strength Endurance**

**Muscular Endurance:** It is the body's ability to resist fatigue during continuous effort, which is characterized by long durations and involves certain levels of muscular strength. It is a combination of endurance and strength. Given the close relationship between strength endurance and muscular strength, it is classified as one of its types. Strength endurance is crucial for all sports that require a specific level of muscular strength over extended periods, with repeated performance, such as rowing and cycling. (Mohamed Hassan Allawi, 1990, p. 100).

#### 2.3- The Relationship Between Muscular Strength and Body Weight

World records in weightlifting indicate that achieving such levels largely depends on body size and weight. Heavier athletes attain greater absolute strength compared to lighter athletes.

Athletes with heavier bodies excel in sports that require maximal strength, such as shot put, javelin throw, and rowing, as they belong to the heavy-weight category.

On the other hand, sports that require athletes to overcome their body weight, such as gymnastics, demand relative strength, which is defined as the degree of strength an athlete develops relative to their body weight to overcome it. This strength can be calculated using the following formula: (Mahmoud Awad Bassiouni, Faisal Yassin Al-Shati, 1992, p. 172).

## **Relative Strength = (Absolute Strength of the Athlete) / (Body Weight)**

## **3.3- Developing Maximal Strength**

Maximal strength is developed through the **repetition training method**, which involves applying high-intensity loads, followed by rest periods until the athlete recovers, then repeating the load. The optimal training components are as follows: (Mufti Ibrahim Mohamed, 1998, p. 360).

- Load intensity: Resistance between 80-100% of the athlete's maximum capacity.
- Load volume:
  - Repetitions per exercise: 1 to 10 times.
  - Total sets per exercise: 2 to 4 sets.
- **Rest period between repetitions:** Until recovery is achieved. (Mohamed Hassan Allawi, 1990, p. 122).

It is essential to perform stretching exercises after strength training sessions.

## A- Examples of Maximal Strength Exercises During General and Specific Preparation Periods

- **Pushing against a wall with the back** using resistance of 80% of the athlete's maximum capacity, repeating the movement 1-3 times, with a rest period of 2-3 minutes.
- Carrying a suitable teammate on the shoulders and holding the position, repeating the movement 1-3 times, with a rest period of 2-3 minutes. The movement should be performed slowly.
- Lifting a fixed weight from a standing position at 80% of the athlete's maximum capacity, bending the knees slightly (quarter or half squat), repeating the movement 1-3 times, with a rest period of 2-3 minutes. (Mufti Ibrahim Mohamed, 1998, p. 361).

# **B-** Examples of Maximal Strength Exercises During Match Preparation and Competition Periods

Exercises similar to those used in the general and specific preparation periods are employed, with gradual increases in load intensity, ensuring it aligns with the other training components. (Mufti Ibrahim Mohamed, 1998, p. 362).

## 4.3- Developing Muscular Strength Distinguished by Speed (Muscular Power):

Interval training with high intensity is used to develop speed-specific strength. The recommended training load components are as follows:

- Load Intensity: Resistance should be 40-60% of the maximum load an athlete can handle.
- Load Volume: Each exercise should last 15-20 repetitions.
- Number of Sets: 4-6 sets with maximum execution speed.
- **Rest Period Between Repetitions**: Until the athlete returns to near-normal condition.

# A- Examples of Speed-Specific Strength Exercises During General and Special Preparation Periods:

- 1. Jumping high with one foot while lifting the knee of the other leg as high as possible, repeated **15-18 times** at maximum effort.
- 2. Jumping high with one foot twice over a short distance, then once over a longer distance, repeated **15-18 times** at maximum speed.
- 3. Long jumps with wide strides, repeated **12-18 times** at maximum speed.
- 4. From a squatting position, jump forward, sideways, or rotate.
- 5. Jump and lift both legs forward while bending the torso to touch them with the hands.
- 6. Jump high to head a virtual ball. (Mofthi Ibrahim Mohamed, 1998, pp. 363-365).

## **B-** Examples of Speed-Specific Strength Exercises During Match Preparation (Friendly or Trial Matches) and Competition Periods:

- Shooting at the goal or a wooden target with maximum force.
- Running and jumping to head a hanging ball.

- Jumping over multiple hurdles and then shooting at the goal with maximum power.
- Throwing long-distance throw-ins between two teammates. (Mofthi Ibrahim Mohamed, 1998, pp. 367-368).

5.3- Developing Strength Endurance: This was discussed in the types of specific endurance.

#### 6.3- Developing Muscular Strength for Youth:

The use of strength training during the growth stages of youth and adolescents remains a subject of debate and discussion. However, it is essential to distinguish between moderate to submaximal weight training and maximum weight training, which may cause issues such as growth plate injuries. Repeated injuries can become chronic, leading to conditions such as ankle joint injuries, spinal problems, lower back pain, and posture deformities.

That said, muscular strength can be developed before puberty without such risks if training is well-organized and guided, ensuring no use of maximum strength. In this case, 10-12 repetitions are recommended, and resistance can come from body weight or a training partner. Safety measures should be considered, avoiding exercises that involve lifting weights above head level to protect the spine. Additionally, after rapid growth spurts during puberty, flexibility and stretching exercises should be incorporated to counteract any negative effects of strength training on joint flexibility. (*Abu Alaa Ahmed Abdel Fattah & Ahmed Nasr El-Din Said, 1993, p. 122*).

There are also key considerations in training for youth muscle strength development, including:

- 1. Exercises should involve moderate or light loads, with high volume and low intensity in the early years of training.
- 2. Special care must be taken with forward torso bending exercises to prevent excessive stress on body ligaments and vertebrae, which could cause injuries.
- Cooperation between coach and physician is crucial—medical examination before training is a necessity, along with regular medical check-ups during training.
- 4. Proper warm-up is essential, and strength training should be combined with relaxation and stretching exercises.

5. Coaches must ensure that athletes follow instructions, as many young athletes tend to overestimate their strength, increasing their risk of injury. (*Mohamed Hassan Allawi*, 1990, pp. 136-137).

The following table shows the progression of load intensity concerning an athlete's age and years of training experience for maximum strength development training:

Training Year	Athlete's Age	Load Intensity (% of Maximum Ability)
First Year	15 years	20 - 50%
Second Year	16 years	30 - 60%
Third Year	17 years	40 - 70%
Fourth Year	18 years	50 - 80%
Fifth Year	19 years	60 - 90%
Sixth Year	20 years	80 - 100%

Source : (Mohamed Hassan Allawi, 1990, p. 136).

## **Cours 11: Coordinative Abilities and Methods of Their Development**

Below, we discuss the physical attributes of flexibility, agility, coordination, and balance, which some refer to as coordinative abilities instead of physical attributes.

#### **Fourth – Flexibility (FLEXIBILITY):**

- **Definition by Kharabogy (KHARABOGY):** "The ability to perform movements to the maximum possible extent."
- **Definition by Bucher (BUCHER):** "The wide range of motion of a specific joint or the entire body." (Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 200).

## **1.4 Types of Flexibility:**

Flexibility can be classified into general (comprehensive) flexibility and specific flexibility.

#### A- General Flexibility:

An individual reaches a good level of general flexibility when they possess excellent motor abilities for all different joints of the body.

#### **B-** Specific Flexibility:

Different sports activities require specific and distinctive types of flexibility in certain body parts, such as the special flexibility needed for hurdle runners and floor exercise gymnasts. Specific flexibility for various sports depends on the level of general flexibility. (Mohamed Hassan Allawi, 1990, p. 190).

Some scholars categorize flexibility into two types: positive flexibility and negative flexibility.

#### **A- Positive Flexibility:**

This refers to the ability to reach a wide range of motion in a particular joint due to the activity of a specific muscle group related to that joint. An example of this is the forward leg swing to a high level.

#### **B-** Negative Flexibility:

This refers to the maximum range of motion resulting from the influence of external forces, such as performing exercises using a wall bar or with a partner's assistance. It is noted

that the degree of negative flexibility is higher than positive flexibility. (Mohamed Hassan Allawi, 1990, pp. 190-191).

## 2.4 Flexibility and Stretching in the Annual Training Plan:

Flexibility development exercises begin in the first week of the preparation period and continue throughout the season. It is essential that the warm-up phase in every training session includes some flexibility and stretching exercises. (Mufti Ibrahim Mohamed, 1998, p. 389).

## **3.4 Developing Flexibility:**

During sports training, the following principles should be observed to ensure the effective use of various flexibility exercises:

- 1. Flexibility exercises should be included in the preparatory phase of every training session, with diversity and variation, especially in daily continuous training.
- 2. Proper warm-up should be ensured before performing specific flexibility exercises to avoid injuries.
- 3. Avoid developing flexibility when the individual feels fatigued or exhausted, such as at the end of a training session.
- 4. Each exercise should be repeated an adequate number of times (10-20 repetitions).
- 5. As much as possible, flexibility exercises should resemble the fundamental motor skills of the specialized sports activity.
- 6. The flexibility exercises should be appropriate for the individual's current level.
- Flexibility development is faster and easier in children and adolescents, particularly between the ages of 11-14. Once flexibility is developed at this stage, it can later be maintained. (Mohamed Hassan Allawi, 1990, pp. 192-193).

## 4.4 Some Flexibility Exercises:

- Pressing the arms backward with a partner's assistance.
- Pressing the trunk while keeping the arms and legs straight, which can be performed without a partner.
- Attempting to touch the foot with the hand.

- Arching with a partner's assistance (climbing onto the partner's back).
- Swinging the hand and foot sideways using a wall bar. (Mohamed Hassan Allawi, 1990, pp. 194-195).

## Fifth - Agility (AGILITY)

## **1.5 - Concept of Agility:**

- Charles Bucher defines it as "the ability to change body positions in the air."
- Manel (1970) defines it as "the ability to achieve good coordination of movements in all parts of the body or a specific part such as the hands, feet, or head" (Mahmoud Awad Basyouni, Faisal Yassin Al-Shati, 1992, p. 197).
- Another definition states that agility is "the ability to change body positions, speed, or directions on the ground or in the air with accuracy, fluidity, and correct timing" (Mufti Ibrahim Hamad, 2010, p. 203).
- According to **Hassan Alawi**, the definition by **Hirtz** is considered one of the most suitable definitions of agility in sports training. Hirtz defines agility as:
  - 1. The ability to master complex movement coordination.
  - 2. The ability to quickly learn and master sports motor skills.
  - 3. The ability to rapidly adjust movement performance to suit changing conditions.

Generally, agility exercises begin in the first week of the preparation phase and continue until the end of the sports season (Mohamed Hassan Alawi, 1990, p. 201).

## 2.5 - Importance of Agility:

Agility is one of the most crucial physical components for sports activities requiring rapid body position changes in the air or on the ground, sudden starts and stops, integrating multiple skills into a single framework, or executing movements characterized by complexity, change, speed, precision, and coordination. The components of agility include:

- The ability to react to movement.
- The ability to control movement direction.
- The ability to maintain balance in motion.

- The ability to coordinate movements.
- The ability to anticipate movement.
- The ability to link movements.
- Speed of movement.

## 3.5 - Types of Agility:

#### A. General Agility:

Refers to the ability to perform a motor task characterized by variety, diversity, and multiplicity with accuracy, fluidity, and correct timing (Mufti Ibrahim Hamad, 2008, p. 200).

#### **B. Specific Agility:**

Refers to the ability to perform a motor task aligned with the characteristics, structure, and movement composition of competition tasks in a specialized sport (Mufti Ibrahim Hamad, 2008, p. 200).

## 4.5 - Agility in the Annual Training Plan:

General agility exercises begin in the first week of the preparation phase, gradually decreasing as specific agility exercises replace them. In the specialized preparation phase, specific agility exercises take the highest proportion (Mufti Ibrahim Mohamed, 1998, p. 385).

## **5.5 - Developing Agility:**

When selecting agility exercises, the following can be considered:

- Exercises that incorporate new or unfamiliar movements with or without a ball, integrating them into fundamental skills.
- Performing fundamental skills with a large number of players in relatively confined spaces.
- Combining complex motor skills with agility exercises in a constantly varied manner.
- Performing skills between cones, hurdles, medicine balls, or obstacle runs.
- Performing skillful movements using the opposite leg or an unusual body part.
- Performing exercises in unconventional situations, such as gymnastics skills on different apparatuses (Mufti Ibrahim Mohamed, 1998, p. 384).

## 6.5 - Examples of General Agility Exercises:

- Forward roll from a quadruped position, then standing up.
- Forward roll from running, followed by jumping upwards, then repeating the roll multiple times.
- **Running between cones** while trying to tag a partner.
- **Running among teammates** while attempting to tag them.
- **Running forward, then backward**, followed by forward and sideways running (Mufti Ibrahim Mohamed, 1998, pp. 385-386).

## 7.5 - Examples of Specific Agility Exercises:

- Running with the ball; at the signal, drop to the ground in a prone position, get up, and continue running with the ball.
- Running with the ball; at the signal, lie on the back, get up, and continue running with the ball.
- Running with the ball; at the signal, change direction while keeping control of the ball.
- Running with the ball; at the signal, perform feinting and deceptive movements (Mufti Ibrahim Mohamed, 1998, p. 387).

## **Cours 12 : Coordination Abilities and Their Development (Continued)**

## Sixth – Coordination (COORDINATION)

## **1.6 – Concept of Coordination:**

- Coordination refers to "the ability to perform identical or different movements of the body in various directions simultaneously." It is an advanced neuromuscular function that requires a high level of brain signal control to execute different motor actions accurately.
- Coordination is defined as "an individual's ability to organize different movements of varying forms and directions smoothly and precisely into a single motor performance."
- It is the ability to integrate different types of movements into a unified framework.
- It is also the ability to synchronize the movements of different body parts when performing comprehensive actions.

## 2.6 – Types of Coordination:

- 1. General Coordination and Specific Coordination
- 2. Limb Coordination and Whole-Body Coordination
- 3. Hand-Eye Coordination and Foot-Eye Coordination (Saleh Mohammed Saleh Mohammed, 2017, pp. 141-142)

#### 1 – General Coordination and Specific Coordination:

- General Coordination: Observed in performing basic motor skills such as walking, running, jumping, pushing, and climbing.
- **Specific Coordination:** This type aligns with the nature of a particular physical activity. In all sports activities such as football, volleyball, basketball, and athletics, athletes must perform specific coordination skills according to the type of movement, such as neuromuscular coordination in football skills or spike skills in volleyball.

## 2 – Limb Coordination and Whole-Body Coordination:

• This type of coordination is determined based on the body's movement during skill execution. Some movements require the participation of the entire body, while others involve only the legs or arms.

## 3 – Hand-Eye Coordination and Foot-Eye Coordination:

- Coordination here is classified into two types, both considered fundamental components of general motor ability:
  - Foot-Eye Coordination
  - Hand-Eye Coordination (Ali Mohammed Yassin, 2011, p. 7) (Accessed on 15/04/2020 at 11:32, Published Research by Professor Ali Mohammed Yassin, Online: <u>IASJ.net</u>)

## **3.6 – Coordination Development and Its Importance:**

- Coordination is linked to other physical components such as agility, balance, proprioception, and flexibility. It is also associated with intelligence and academic achievement. Coordination plays a vital role in children aged 6-9 years as they develop motor skills and require coordination for daily movements. Motor coordination reaches an advanced level between the ages of 13-14 years. A lack of coordination ability may lead to poor performance, inefficiency, and a higher risk of injury. (*Saleh Mohammed Saleh Mohammed, 2017, pp. 141-142*)
- Coordination exercises are essential and should be regularly included from the beginning of physical preparation and throughout its different stages. They help maintain technical performance, which often deteriorates as physical attributes improve.
- Coordination exercises should be performed with a 48-hour rest interval between training sessions, as they are physically demanding on the central nervous system. Coaches should include relaxation exercises after coordination training. (Saleh Mohammed Saleh Mohammed, 2017, pp. 141-142)

## **1.7 – Concept of Balance:**

- In simple terms, balance is the ability to maintain the body's center of gravity within its base of support, which is usually the body part in contact with the ground.
- The larger this contact area, the greater the body's stability. When multiple body parts are in contact with the ground, they form the base of support. The smaller this base, the greater the need for control over body positions to maintain balance. (*Saleh Mohammed Saleh Mohammed*, 2017, p. 143)
# **2.7 – Definitions of Balance:**

- Larson & Yokim: "Balance is the individual's ability to control physiological systems from a muscular and nervous perspective."
- **Kyurin:** "Balance is the individual's ability to control physiological and anatomical capacities affecting balance while maintaining spatial awareness, with or without vision, through muscular and nervous control."
- **Singer:** "Balance is the ability to maintain the body's position."
- **Roth:** "Balance is the ability to retain a specific body position during both static and dynamic states."
- Based on these definitions, balance can be defined as "an individual's ability to control a specific body position during rest or movement by regulating muscular and nervous functions." (*Saleh Mohammed Saleh Mohammed*, 2017, p. 144)

# **3.7 – Types of Balance:**

There are two types of balance:

- 1. Static Balance: The ability to maintain a stationary position.
- 2. **Dynamic Balance:** The ability to maintain balance while in motion. (Saleh Mohammed Saleh Mohammed, 2017, p. 145)

# 4.7 – Importance of Balance and Its Development:

- Balance, in practical terms, is a sophisticated neuromuscular control function. When the base of support is relatively small and an athlete attempts to perform a skill, maintaining balance while executing the skill efficiently is considered a high level of agility, reaching what is known as **proficiency**.
- Highly talented and elite athletes possess superior balance abilities, emphasizing the importance of developing balance for every player. Coaches should focus on improving balance individually for outstanding athletes.
- Balance exercises can be integrated into agility training, or assigned as separate exercises in training sessions. (Saleh Mohammed Saleh Mohammed, 2017, pp. 144-145)

## **Cours 13 : Training Science Plans and Programs**

### **1- Introduction:**

Training planning is a scientific process and method aimed at helping athletes achieve high levels of sports performance in training and competition. It is considered one of the most important tools for coaches to design their training programs, as it involves applying science rather than relying on randomness, trial and error, or coincidence. Therefore, a coach must possess a high degree of knowledge, experience, and skill to effectively plan and integrate various pieces of information. The plan should be based on objective principles, drawing on competition results, tests, and the continuous development of different aspects of athlete preparation (Risan Khraibet & Abu Alaa Abdel Fattah, 2016, p. 515).

Planning is a crucial foundation in sports training to ensure the continuous improvement of athletic performance. Reaching high athletic levels does not happen by chance; rather, it requires long-term organized training. This highlights the significant role that planning plays in the sports training process.

Planning is not always associated with long-term periods; it is equally essential for short-term planning, where specific goals and detailed tasks for each phase can be determined.

Effective sports training planning should include the following:

- 1. Defining the objectives to be achieved.
- 2. Identifying the tasks derived from the objectives and determining their priority.
- 3. Determining the different theories, methods, and means necessary to achieve key tasks.
- 4. Establishing the timeline for different training phases.
- 5. Selecting the most suitable organizational structures.
- 6. Allocating the required budgets (Mohamed Hassan Allawi, 1990, pp. 285-286).

## 2- Basic Forms of Sports Training Planning:

Sports training plans vary according to several factors, such as their duration, objectives, and content. Coaches use the following planning models:

- Training Lesson / Unité d'entrainement (Training Session)
- Microcycle (Short training cycle)

- Mesocycle (Medium training cycle)
- Macrocycle (Long training cycle)
- Annual Plan
- Quadrennial Plan (Four-year plan)
- Megacycle (Long-term training cycle)

## **2.1-** The Training Unit:

The training unit, also known as the training session, is the fundamental component of a training program. It consists of a set of various exercises forming a specific training load that athletes perform within a particular time frame during one session.

Thus, the training session serves as the foundation for planning an entire macrocycle or sports training season. Success in designing and structuring training loads during a single session is the first step toward an effective training plan for the full season. Therefore, several requirements must be considered when structuring training units, including their primary objectives, how to regulate different training loads, the types of training sessions, their various physiological effects, and how to coordinate and sequence these sessions within a single training day, microcycle (weekly cycle), and ultimately throughout the full training season (Risan Khraibet & Abu Alaa Abdel Fattah, 2016, pp. 516-517).

### 2.1.1 Key Components of a Training Unit:

A training unit consists of three main parts: the preparatory phase, the main phase, and the concluding phase.

### A. Preparatory Phase (Warm-up):

This is the initial part of a training session, aimed at preparing the athlete for the main phase. It involves warm-up exercises, which offer several physiological benefits, including:

- 1. Increasing metabolic rate by 7% and body temperature by half a degree.
- 2. Enhancing oxygen and nutrient supply to tissues, facilitating metabolism.
- 3. Improving muscle contraction and relaxation speed, reducing injury risk.
- 4. Lowering muscle viscosity to prevent strains.

5. Protecting the heart from sudden exertion that could lead to serious health complications.

Warm-up exercises can be categorized into general and specific warm-ups (Risan Khribet & Abu Alaa Abdel Fattah, 2016, p. 518).

# • General Warm-up:

- Prepares the central nervous and musculoskeletal systems.
- Enhances cardiovascular and respiratory function.
- Promotes enthusiasm and readiness for training.

# • Specific Warm-up:

- Prepares athletes for the physiological demands of their specific sport.
- Should mimic actual competitive scenarios.
- Is particularly vital in both individual and team sports. (Saleh Mohamed Saleh Mohamed, 2017, p. 265).

# **B. Main Phase:**

This phase is dedicated to achieving the primary training objectives. The type of exercises used varies depending on the session's goals, whether focused on physical and psychological preparation, skill enhancement, or tactical development (Risan Khribet & Abu Alaa Abdel Fattah, 2016, p. 519).

- The main phase typically lasts two-thirds (2/3) or three-quarters (3/4) of the total session time.
- It is recommended to start with exercises requiring maximum focus, attention, and effort.
- If multiple training objectives exist, skill and tactical exercises should come first, followed by reaction-based drills, then speed exercises to avoid fatigue.
- Strength and endurance training can be incorporated from mid-phase onward.
- Ideally, a session should focus on **one or two key objectives** to ensure effective athletic development. (Saleh Mohamed Saleh Mohamed, 2017, p. 266).

### C. Concluding Phase (Cool-down):

This phase focuses on returning the athlete's body to a near-normal state after exertion (Mohamed Hassan Allawi, 1990, p. 329). It aims to:

- Gradually reduce training intensity.
- Facilitate the heart's recovery process.
- Replenish oxygen debt and eliminate metabolic byproducts.
- Calm the nervous system using relaxation exercises.
- Avoid mentally demanding exercises. (Saleh Mohamed Saleh Mohamed, 2017, p. 267).

## 2.2- The Microcycle (Microcycles):

The microcycle consists of several training doses (training units). The duration of the microcycle varies depending on several factors, including the objectives of the cycle, its position within the training season, and the relative time allocated to it. However, the most commonly used duration is one week, as it aligns with the natural weekly biological rhythm of the athlete. In some cases, this period may range from 4-5 to 10-14 days, while in rare cases, a microcycle lasting only two days may be used in special circumstances requiring reinforcement of specific training tasks within a relatively short period. Nevertheless, the weekly load cycle remains the most commonly used (Raisan Khuraibet, Abu Alaa Abdel Fattah, 2016, p. 529).

It follows a weekly rhythm (weekly/Hebdomadaire) and can be shorter than a week, lasting only two training days, thus forming a weekly training cycle. This allows for one to two training sessions per day, totaling approximately 12 sessions per cycle, depending on the specific sport practiced, the athlete's level, and the training season. The load structure of the microcycle is determined based on its position within the training season, the objectives of each season, and its connection to the mesocycle, as it is an essential component. Additionally, the type of cycle—whether training, recovery, or special preparation (shock)—is taken into account.

The structure of a weekly microcycle (Weekly Microcycles / Microcycles Hebdomadaire) consists of two stimulation phases (deux phases de stimulations / two phases of stimulation) separated by a recovery session and concluding with an active rest day (active rest / Repos Actif).

Microcycles can be classified based on the training seasons and the training load required to achieve the goals of each season into three main types:

- Developmental Microcycles (Microcycles Graduel)
- Shock Microcycles (M. de Choc)
- Regeneration Microcycles (M. de récupération) (Amoura Yazid, 2019, pp. 62-63).

### **1.2.2- Types of Microcycles:**

According to Raisan Khuraibet and Abu Alaa Abdel Fattah, the types of microcycles include:

- A. Preparatory cycle
- B. Basic cycle
- C. Competition preparation cycle
- D. Recovery cycle
- E. Competition cycle
- F. Compensation cycle

### 3.2- The Mesocycle (Mesocycles):

The mesocycle is a key component in structuring the macrocycle or training season. It usually consists of several (weekly) microcycles, typically ranging between 4-6 cycles. The number of cycles depends on the length of the mesocycle, which in turn is determined by the duration of the training season. The length of a mesocycle is often close to one month, making it compatible with the human body's natural monthly rhythm. This belief is based on the idea that human vitality and physical activity follow a wave-like pattern of highs and lows, with a natural biological cycle lasting approximately 23 days. This pattern is particularly evident in the natural monthly cycle of female athletes. The structure of the mesocycle is based on certain physiological principles that are not significantly different from those of the microcycle (Raisan Khuraibet, Abu Alaa Abdel Fattah, 2016, p. 539).

# 4.2- The Macrocycle (Macrocycles):

The training cycle, also referred to as the training season, consists of multiple mesocycles and is, at the same time, part of a long-term preparation plan extending over several years. The duration of the macrocycle varies, lasting from several months to up to four years when preparing for an Olympic event.

Due to the increasing number of competitions and major championships within a single year, multiple macrocycles may be required within one year. As a result, training planning has evolved to accommodate different seasonal structures:

- A single-season year, where preparation is focused on one major championship.
- A two-season year, with two major training cycles.
- A three-season year, incorporating three major cycles.
- In some sports, up to five training seasons can be included in a single year (Raisan Khuraibet, Abu Alaa Abdel Fattah, 2016, pp. 548-549).

# 5.2- Annual Training Plan

### **1.5.2-** Types of Annual Training Plans:

The annual training plan is divided into:

### A- Single-Season Competitive Annual Training Plan:

Training is planned based on the assumption that the competition consists of a series of consecutive matches, as in the case of football training planning. This means that the year includes only one competitive season.

#### **B- Dual-Season Competitive Annual Training Plan:**

The annual training plan is designed with the assumption that the year contains two competitive seasons. The athlete undergoes a preparatory period, then competes in the first semester, followed by a recovery and evaluation period. Afterward, the athlete enters a second preparatory phase, competes in the second season, and concludes with a second recovery and evaluation period (Mufti Ibrahim Hammad, 2008, p. 267).

#### **C- Multi-Season Competitive Annual Training Plan:**

This plan is structured based on the presence of three or more competitive seasons within a single year. The planning process follows the same approach as the dual-season plan but includes a third or more competitive seasons (Mufti Ibrahim Hammad, 2008, p. 267).

### - Structure and Formation of the Competitive (Training) Season:

Regardless of the number of competitive seasons in the annual training plan, a single competitive season consists of three main periods:

# **1- Preparatory Period:**

This is the period during which the athlete is prepared to participate in the competitive season matches. It begins at the end of the previous recovery and evaluation period with the first training session and ends with the first official match of the competitive season.

The preparatory period is divided into three phases:

- General Physical Preparation Phase (PPG).
- Special Physical Preparation Phase (PPS).
- Experimental Competition Phase (Pre-Competition).

# A- General Physical Preparation Phase (PPG): This phase aims to:

- Improve physical fitness components and provide a foundational physiological adaptation for the body's systems.
- Learn new skills, review and develop previously acquired skills, and partially integrate them with other skills.
- During the planning of the general preparation phase, the training load volume is increased while intensity decreases, with relatively long rest periods. As the special preparation phase approaches, the training volume decreases while intensity increases.

# B- Special Physical Preparation Phase (PPS): This phase aims to:

- Improve special physical preparation and enhance the efficiency of physiological systems to align with the specialized sports performance (Mufti Ibrahim Hammad, 2008, p. 269).
- Develop skill training to reach an automatic performance level while integrating it with physical fitness and tactical strategies.
- Learn new tactical strategies and master previously learned ones within a strategic preparation framework.
- Integrate all types of preparation into a cohesive and comprehensive structure.

# C- Experimental Competition Phase (Pre-Competition): This phase aims to:

• Enhance various preparation levels gradually to achieve peak sports performance during official competitions.

- Determine the best team formation and potential scenarios players may face in official competitions.
- Reach the highest levels of psychological and ethical preparation by the end of the phase.

# **2-** Competition Period:

This is the period during which the competitive season matches take place. It begins with the first official match and ends with the last official match. The planning of the competition period aims to maintain the high level of performance achieved during the preparatory period across its different phases. The objectives of this period include:

- Reaching the peak of physical and functional performance levels.
- Achieving the highest level of skill performance automation and adapting it to match conditions.
- Attaining peak tactical performance and employing appropriate strategies based on the nature of the opponent and match conditions.
- Reaching the highest level of psychological interaction with various expected and unexpected situations.
- Achieving harmony and integration among all preparation types to ensure that individual performance aligns with team performance in team sports (Mufti Ibrahim Hammad, 2008, p. 270).

# **3-** Recovery and Evaluation Period (Transition Phase):

This period follows the competition phase immediately. It begins after the last match of the competitive season and ends with the first training session of the physical preparation phase for the next competitive season. The planning of the recovery and evaluation period aims to:

- Maintain a minimum level of physical, skill, and tactical preparation.
- Refresh the player's psychological state by reducing stress, minimizing boredom, and boosting morale.
- Conduct major evaluations of training plans from all aspects in light of achieved results and the player's performance level.

• Focus on treating injuries if present (Mufti Ibrahim Hammad, 2008, p. 271).

# 6.2- Long-Term Sports Development Plans:

The long-term sports development plan represents the largest unit in the sports training planning system. This type of planning typically covers a period ranging from 8 to 15 years, starting from the initial practice of a sport to reaching the highest possible athletic level. Some researchers classify long-term sports development plans into the following stages:

- The initial stage of sports practice.
- The specialized sports training stage.
- The advanced athletic training stage (Mohamed Hassan Allawi, 1990, pp. 289-290).

# **Cours 14: Recovery in Sports Training**

### 1- Recovery, Rehabilitation, or Rest in Sports Training:

Recovery (rest) is one of the main components of training load. It refers to the time relationship between load periods or between one repetition and another of an exercise. Organizing the balance between load and rest is a crucial factor in ensuring the athlete's relative return to their normal state (recovery), thereby maintaining their ability to work, perform, and tolerate additional training loads. In some cases, training can be performed without rest periods, as seen in continuous load training methods, which are essential for functional adaptation. However, it is necessary to include specific rest periods between repetitions or sets, depending on the intensity and type of exercise. The rest period is determined based on the intensity and volume of the load.

As a general principle, the athlete should reach a state at the end of the rest period that allows them to perform the next exercise effectively. Scientists suggest that the optimal rest period is when the athlete's heart rate drops to approximately **120 beats per minute**. Thus, recovery is the period during which physiological functions return to their normal state after the physical stress caused by training. (Graduate Students in the Faculty of Physical Education and Sports Science, 2015, p. 10)

- Risan Khraibet and Abu Al-Ala Abdel Fattah define recovery (rehabilitation) as: improvement, renewal, activation, restoration, strengthening, reconstruction, reproduction, compensation, and healing. It is also defined as the period following exertion, during which the individual regains or surpasses their pre-exercise state and restores the ability to handle another training load.
- Jonath (1988) defines it as "the temporary decline in performance level due to physical and psychological loads." (Risan Khraibet, Abu Al-Ala Abdel Fattah, 2016, pp. 379-380)
- Based on the aforementioned definitions, sports recovery refers to the period following performance during which all or some of the effects of training are eliminated, allowing the athlete to be prepared for subsequent performances at the required level to achieve the set goal. (www.lamya.yoo7.com/t434-topic)

### 2- Types of Rest:

Recovery periods are classified into two main types:

### A- Passive Rest (Inactive Recovery):

This is complete rest, where the athlete refrains from any form of training or physical activity. In other words, no intentional physical exertion is performed. However, if passive rest is applied randomly without being incorporated into a training plan, it can lead to performance decline. When included strategically in a training program under specific conditions, it helps the body recover and prepare for future training sessions. Examples of passive rest include standing still, sitting, or lying down after a workout.

#### **B-** Active Rest (Active Recovery):

This type of rest involves engaging in certain low-intensity physical activities that aid in restoring the body's ability to perform another sports activity. It includes performing light exercises between training sets or sessions, such as flexibility and relaxation exercises after strength training, or light jogging after sprinting. (Graduate Students in the Faculty of Physical Education and Sports Science, 2015, p. 10)

Additionally, rest can be classified based on intensity levels into two types:

#### A- Complete Rest:

During this phase, the body's physiological processes slow down significantly, and heart rate typically decreases to **110-120 beats per minute**.

# **B- Incomplete Rest:**

In this type, the heart rate remains at approximately **140 beats per minute**, indicating that the body has not yet returned to its normal state. (Graduate Students in the Faculty of Physical Education and Sports Science, 2015, p. 11)

### **3- Stages of Recovery:**

#### **3.1- Continuous Recovery:**

This type occurs during the execution of the training load or competition, allowing the body to compensate for oxygen deficiency while running.

# **3.2- Rapid Recovery:**

This type takes place at the end of the training session, where the body eliminates energy waste products such as  $CO_2$  and LA, while also replenishing some energy sources that were consumed during physical exertion.

# **3.3- Deep Recovery:**

During this stage, adaptation processes occur, and the athlete reaches a better physiological and psychological level than before.

# **4-** Types of Recovery:

# **4.1- Positive Recovery:**

It includes:

- **Cooling-down activities:** Such as light jogging at the end of a training session for 15 minutes.
- **Training load distribution:** Ensuring that high-intensity training sessions are not performed consecutively or with excessive volume within a microcycle (weekly cycle).
- Fluid replacement: Drinking fluids, especially water, before, during, and after training. Water intake with glucose is one of the best ways to replenish fluids and energy.
- Nutrition: The diet should contain a high percentage of complex carbohydrates, which should be consumed immediately after competition or training to restore glycogen lost by muscles. It should also include foods rich in minerals (sodium, potassium, iron, etc.).
- Sleep: Athletes should maintain a consistent sleep schedule and avoid staying up late, ensuring at least 8 hours of sleep.
- **Walking:** Free walking helps with relaxation and unwinding at the end of the training day.

# 4.2- Passive Recovery:

It includes:

- Massage: Helps eliminate lactic acid and stimulate blood circulation.
- **Relaxation baths:** Using a jacuzzi at 36°C helps eliminate lactic acid and restore heart rate.
- Sauna: Used for recovery and can be combined with massage once a week.

### **5- Recovery Through Training Methods:**

Training methods for recovery include all measures adopted by the coach before, during, and after training. These methods focus on balancing training loads of varying intensity, direction, type, and effect while considering fatigue levels. Recovery time is planned based on required adaptation processes and the nature of rest, whether within training sessions, between training sessions, or across different training cycles. Properly structuring training loads according to the athlete's abilities and individual differences ensures optimal adaptation to training goals and speeds up recovery from fatigue.

### 6- Biological Foundations of Recovery:

### 6.1- Replenishing Muscle Phosphate Stores:

Muscle phosphate stores (ATP, PC) serve as the primary direct energy source for physical activity. ATP is initially utilized through its breakdown by ATPase, while PC (phosphocreatine) is the key component in ATP resynthesis via the CPK enzyme. The rate and duration of ATP store replenishment vary.

## 6.2- Replenishing Glycogen Stores:

Glycogen is stored in three areas: muscles, blood, and liver, with total body stores ranging from 350–450g. During physical exertion, athletes lose a significant portion of these stores and must replenish them either during activity or recovery. Glycogen metabolism in muscles depends on:

- Its concentration and oxygen supply via the respiratory system.
- The rate of lactic acid accumulation in blood and muscles.

The restoration of glycogen levels depends on several factors, including:

- The type of food consumed after exertion.
- The type of training load (continuous or interval training).

## 6.3- Myoglobin and Oxygen:

Myoglobin facilitates oxygen transport across muscle cell membranes for oxidation and energy production. Its function is linked to hemoglobin, and its concentration varies between red and white muscle fibers, with an average of 11mmol/kg of muscle. Myoglobin-bound oxygen is estimated at 500ml. After exertion, myoglobin oxygen stores replenish similarly to phosphate stores—rapidly at first, then slowing down.

# 6.4- Eliminating Lactic Acid from Blood and Muscles:

Approximately 85% of lactic acid produced during exercise is converted back into glycogen in the liver, while 15% is broken down into water and carbon dioxide, requiring oxygen for elimination. Removing lactic acid is crucial to prevent muscle cramps after training or in the following days, as its accumulation leads to muscle fatigue. Eliminating lactic acid takes time and can be facilitated by:

- **Positive recovery methods:** Light jogging at a heart rate of 120 bpm for a set duration.
- Flexibility, relaxation, and cool-down exercises.
- Massage and sauna treatments, which help remove lactic acid buildup within 30 minutes to over an hour.

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