Basic physical qualities

The concept of fitness arose in 1916, when Liam started to measure physical fitness of the subjects. It is an English term "Physical Fitness" that includes the possibility of improving the capacity of the physical movement by practicing any activity or sport.

Have you ever wondered if you're in good shape? It easily come to your mind if you're capable of doing or not certain movement or you surrender to a certain level in a sport or activity.

To distinguish whether the body improves and evolves in different activities, there are a number of motor skills or qualities (physical qualities) that we use to determine the development of each individual, and those form the basis of the physical condition.

1.- MOTOR SKILLS OR QUALITIES

There are many denominations that receive these capabilities.
2.- Basic physical qualities

The basic physical qualities are determined by metabolic processes and energy performance of the voluntary muscles. Their success ensures interaction between them, depending on the type of muscle activity performed.

2.1.- Strength

Is the ability of the muscles to overcome opposition outside. There are different types of strength, depending on the relationship with the other conditional capacities.

To understand the concept of strength is global and there are different classifications of strength, we have only to compare the following examples (all of strength application) and decide which is the "stronger".

- World champion in shot put.
- World champion in weightlifting.
- World champion heavyweight (boxing).
- Mr. Universe (Bodybuilding).
- The high jump champion who submits his body to the 2.40 m.

It is clear that each of them will be the strongest in its field, and we verify that all perform an activity in which the key factor is the strength.

So the Strength classified according to the load and the speed of execution on one side and depending on the type of muscle contraction used by another.

A) Depending on the load and speed of execution

● **Maximum Strength**: Ability to beat a load or ultimate strength regardless of the time taken to do so. Example: Weightlifting.

● **Speed Force**: The ability to overcome resistance or load a weight with high execution speed. Example: the jumps.

● **Strength endurance**: The ability to overcome resistance or half a load at a speed of implementation through several repetitions. Example: rowing.

B) Depending on the type of muscle contraction

● **Dynamic strength or isotonic** (with motion) involves the shortening or lengthening of the muscle, resulting in a movement of body parts involved. It happens when we are able to move a weight. Example: flexing the arms at the elbows to lift a stone.
• **Static or isometric strength** (no movement) is the maximum force exerted on a fixed resistance. We can experience it by trying to overcome a weight much heavier than our possibilities, so no movement occurs. Example: Pushing against a wall

**2.1.1.- Physiobiologic strength development**

Between 11-12 years takes place the development of muscle strength and does not vary much from one child to another or from one sex to the other. In fact, at this age it is normal to have girls with equal or stronger than boys. The need to improve and refine coordination is recommended to improve the strength of the children at these ages.

It is very important at this age, do not specifically work force as might be interfering with the growth and harmonious development of young people. So we will try to work with our own body weight.

**2.2.- Endurance**

The ability to maintain physical effort for a long time. But not the same sustained effort for a long time, such as that of a marathon runner, an effort that a shorter higher rate, such as that of a 800 meters runner. The marathon is a great aerobic endurance, and 800 meters runner has a large anaerobic endurance.

The resistance can be:

**Aerobic:** We say that when we work aerobically we withstand prolonged moderate intensity. It’s the kind of strength we need for long-duration physical activities (+ 3 ') and of moderate intensity. The heart works between 130 and 170 beatsl / min. approximately and there’s a balance between oxygen intake and oxygen demand for activity.

EXAMPLES: Long distance races (3,000 m, 10,000 m, ...), jogging, walking at a rapid pace, jumping rope, cycling, skating, swimming (long distances), dancing, aerobics, sports, ... In short, any activity that makes a moderate pace.

**Anaerobic:** When the movement is performed in oxygen debt. That is, when the demand for oxygen is greater than the supplies. We say that when we work anaerobically withstand intense and obviously for a short period of time. It's the kind of strength we need to carry out activities of short duration (~ 3 ') but high intensity. The heart works over 170 beats / min and about our MCI (Maximum cardiac index, 220 - age), and there is usually an imbalance between the demand for oxygen intake and oxygen in blood, producing an oxygen debt that we recovered at the end of the effort, as in the muscles still missing this (accumulated debt).

EXAMPLES: Racing great intensity up to 1000-1500 m., Swimming at high intensity over short distances, jumps, throws, sprints cycling.

To better understand what it is, we need to know the following:

• Anaerobic threshold: the limit of exercise intensity at which a person happens to produce energy without oxygen.
• ATP: the molecule that makes all energy substrates to produce energy (currency, fuel for the body).

• Aerobic way: how to produce energy by burning ATP with oxygen, making a slow but better performance of every molecule of ATP.

• Anaerobic way: mode of producing energy by burning ATP without oxygen, but immediately. It generates a lot of energy in a very short time but produces lactic acid.

• Lactic Acid: substance resulting from energy production through the anaerobic way. When it comes, changes the blood properties and prevents the proper contraction of muscles.

The development of resistance is increasing from the beginning, except between approximately 12 and 14 years, which coincided with the sexual maturity is dropping slightly. Towards the 28-30 years has the highest potential, both aerobic and anaerobic. Then gradually descends

A good system to control the effort you do is measure the heart rate, ie the number of beats per minute that the heart does.

**How to measure?**

There are three ways to count keystrokes:
1. Placing fingertips on the carotid artery.
2. The fingertips on the radial artery.
3. Hand over the heart.

In cases 1 and 2 cannot use your thumb because it has its own pulse and you can make mistakes when counting. The number of beats per minute can be calculated by counting heart beats for six seconds and then multiply by ten or fifteen seconds during fourfold.

Heart rate varies according to age, gender, individual characteristics and the type of activity being carried out. Thus, when we were born we had a pulse of 140 beats per minute (bpm), this will decrease to about 20 years old when the heart rate goes to 60-70 bpm and after age 50 increases again to 70-80 bpm. Generally, women have a higher heart rate. There are people who trained a lot, whose heart beat rate is very low.

Heart rate varies depending on the activity being performed, too. In the morning, after we wake up, we can measure the resting heart rate. It will increase during the daytime and if done a little physical activity it will increase depending on the intensity of the exercise.

During exercise it is important to keep in mind the maximum heart rate. The maximum heart rate can be calculated in different ways. Let’s consider two of them (examples include a 18 years old person):

<table>
<thead>
<tr>
<th>FORMULA</th>
<th>CALCULATION</th>
<th>EXAMPLE (18 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>William Haskell</td>
<td>220 - age</td>
<td>202 bpm</td>
</tr>
<tr>
<td>Douglas Seals</td>
<td>208 - (age 0.7)</td>
<td>195 bpm</td>
</tr>
</tbody>
</table>

From the knowledge of the maximum heart rate we can start to calculate the intensity of exercise we want to train. For instance: if we want to do an effort of 60 %, the calculation will be: heart rate x 60 % maximum.

2.3. - Speed

In physics is defined as the ability to travel a distance in the shortest time possible. In physical activity, speed means faster action. A 100m runner is fast. There are three types:

2.3.1 Reaction:

The Nervous System has the ability to capture a stimulus and convert it into a muscle contraction or moving as quickly as possible. For example, the output in a 100m race, from the starting signal sounds until the athlete starts moving.

It can also be defined as the time between a stimulus is presented and the response is done S - R

2.3.2 Speed of movement:

It is the ability to perform a particular movement in the shortest possible time. When the movement is a movement, and involves the whole body, is called movement speed and will depend on two factors: the length and stride frequency. When the move is a gesture implies a segment or part of the body; we call it gesture speed.
2.4. - Flexibility

It is the ability of the joints to facilitate wider body movements possible (without getting hurt), thanks to joint mobility and muscle elasticity. Rhythmic gymnastics is a sport that requires a higher degree of flexibility in athletes.

The flexibility of the human body depends on two factors:

- The mobility of the joints, which is the ability of the joints of the skeleton to work with the maximum amplitude that depends on the constitution of our body.

- The elasticity of the muscles, which is that they have the ability to stretch without hurting yourself, and it depends on the training.

3. - Psychomotor qualities

For most activities we need a perfect coordination between the brain - psyche, which is responsible for sending commands, and the muscles that are responsible for executing motor movements. Hence the name of psychomotor qualities. These qualities must be developed from childhood because over time, we can succeed in practice any physical activity or sport.

They are the fundamental movements that makes a person walk, run, jump or turn.

3.1. - General Dynamic Coordination

The degree of development of the coordination determines the possibilities of movement of each person. This quality allows us to simultaneously rotate both arms forward and sprint forward, or dance a rock-and-roll. To make several movements simultaneously, from the simplest to the most complex, it is necessary to work the general dynamic coordination (GDC).

As children we begin to crawl, then we take our first steps and later we learnto go up and down stairs. This progress has allowed us, over time, to develop our basic motor skills: to crawl, to stand up, to fall, to walk, to stop, to catch, to throw, to run, to jump, to hit, to push, to drag, to drift, etc. These movements, we have practiced and improved over our lives and we have reached a level of efficiency that allows us to control the environment in which we live.

We talk about coordination when these basic motor skills relate to each other to achieve more complex movements.

- GDC segmental: they are actions or movements that involve few parts or areas of the body.

Features:
- Movements are easy to make
- The end result is very accurate

Example: when we make a circular movement of the right arm forward and at the same time, a circular motion of the left arm backwards.

Any of the exercises we do in the warm up for the mobility of muscles and joints...

- GDC global actions or movements involving many parts or areas of the body.
Features:
- Movements are difficult to execute
- We need a large concentration
Example: when we do “la roda” legs will give us momentum, arms to support us on the floor, lower back and abdominal muscles to maintain correct position of the body and finally the legs back to the starting position.

3.2. - Special Dynamic Coordination
Many sports use specific material for practice, such as balls, rackets, bats, sticks, etc. Mastery of body movement (CDG), along with the manipulation of objects involved in the game, we can practice different sports. This domain of the body and an object at the same time is called Special Dynamic Coordination (SDC).

- SDC hand-eye:
  Involved in all the launches and receptions that are in sports like basketball and volleyball. One feature is the precision. Examples of this kind of CDE are past and receptions handball, water polo the shot goal and hit the tennis racket.
- SDC eye - head:
  Used in all headers that are in football and also some stops in goal for handball. Is the least accurate of all.
- SDC eye - foot:
  It is used in ball control and shooting with his feet in rugby or football, for example. Such coordination is less accurate than hand-eye SDC.

This type of coordination is present in all the sports that use specific material and has a direct application in the various sports techniques. There are a number of factors that make it difficult learning the SDC. Thus, executing a move will be more difficult when:
- More body parts are involved
- The longer exercise
- More objects are involved

The dominance of this type of coordination will allow us to become better athletes.

4. - Coordination abilities
Anyone who practices a sport need to train and improve their basic physical qualities but also coordination abilities. Capabilities such as rhythm, balance and reaction are essential to successfully meet any sporting situation.

Coordination abilities are those that allow us to control and successfully execute any technical action and/or any sport tactics: the ability to combine movement, rhythm, focus, balance, differentiation, reaction and transformation.

- Combining elements: they enable us to coordinate movements of different body parts to get running a global movement. Eg the mechanics of launching a basketball.
- Orientation is the ability that allows us to determine and/or change the position and movements of the body in relation to the pitch of the ball, opponents and teammates. Eg the goalkeeper position in relation to the ball and colleagues.
- Differentiation: we can perform various movements with different parts of our body simultaneously. Eg the position of the pivot basketball to grab the rebound.
- Balance: allows us to keep or regain standing position if we lost. Eg after a smash in
volleyball.

- Reaction capability that allows us to react as fast as possible before an auditory stimulus, visual or tactile. Eg stops a goal.
- Pace allows us to coordinate movements in relation to an external rhythm (music) or inside (or darker when an exercise). Eg keep up a running mate.
- Transformation: we can modify those movements had thought in terms of the actions of adversaries.

5. - Physical Fitness Factors

The fitness of each individual depends on the following factors, among others:

- Development according to age (child - adolescent - adult - elderly)
- Of the various genetic conditions and equipment systems of the human body, organs that form, especially the heart and muscles.
- From steering coordination of the central nervous system, ie the close collaboration between the brain and the nervous system (reflexes, etc.) And muscle.
- From psychic abilities (personality traits) to improve physical fitness. In sports, these capabilities are mainly: the strength of will, self-confidence, motivation, willingness, joy, excitement, vitality and temperament.
- Relations with the environment and the lifestyle (work, leisure, toxic, etc.).
- From the age of the beginning of the activity.
- In the body type (asthenic, athletic picnic).

6. - Expressions of Physical Condition

Basically, it is possible to distinguish between:

1. Overall fitness
2. Special fitness

The overall fitness has to do with a broad-based training or training and continuous development of the cardiovascular system and harmonious, strength and flexibility, and are the basis of almost all sports.

Special fitness is limited to development of sport specific skills (determined performance), for example, the strength of a weightlifting.

The training should allow improving different motor qualities or abilities that determine fitness. While any type of physical activity leads to improved physical fitness (especially overall), each has quality training in a specific way. The training systems are those that tell us how we do training.

Elements that determine training systems:
- Volume: exercise duration, in meters, time, reps or sets.
- Intensity: number of pulses, time, percentage of effort.
- Recovery: time, heart rate, etc.
- Description of the exercise.