Components of physical fitness are essential for complete fitness of the body and mind. There are five physical fitness components. They are directly related to each other.
✓ **Four categories of the components of physical fitness**

- Health related fitness components
- Skill related fitness components
- Physiological components of fitness
- Sports related components of fitness.
Health related fitness components

Cardio respiratory endurance - “Ability of the circulatory and respiratory system to efficiently adjust to and recover from exercise.”
-> Lab assessment - Treadmill test, Bicycle-ergo meter test.
-> Field assessment – Distance run, distance walk, step tests

Muscular endurance - “Ability of a muscle group to contract over an extended time against moderate resistance”
-> Lab assessment – Dynamometer.
-> Field assessment - sit-ups, flexed arm hand, squat thrust, repeated bench press.

Muscular strength - “Ability of a muscle or group of muscle to generate force in a single maximal effort”
-> Lab assessment- Dynamometer, Tenso meter, cybex
-> Field assessment – 1RM bench press, 1 Rm leg press, 1Rm squat.

Body composition -“Determination of the contribution of body fat and lean tissue to total body weight”
-> Lab assessment- Skin folds, under water weighting.

Flexibility – “Range of movements present at body joint”
-> Lab assessment- Goniometer, flexometer
-> Field assessment – Sit and reach, trunk extensions splits.
Skill related (or) performance or Motor related components of physical Fitness

Motor fitness

“Ability to perform effectively during sports or other physical activity
1. Agility
2. Balance
3. Coordination
4. Speed
5. Power
6. Reaction time/Movement

1. Agility: “Ability to make successive movements in different directions efficiently and rapidly”
-> Lab assessment - Film analysis, EMG analysis
-> Field assessment – shuttle run, line jumps, agility test.

2. Balance: “Ability to maintain equilibrium when one’s center of gravity and base of support are altered.”
-> Lab assessment - Film analysis, EMG analysis
-> Field assessment – Stroke stand, Bass stick jump.

3. Coordination – “Ability to effectively integrated the movements of the body parts”
-> Lab assessment - Film analysis, EMG analysis
-> Field assessment – Ball catch, jump rope, jumping jack, wand leap.

4. Speed: “Ability to perform rapidly successive movements over a short period of time in single directions”
-> Lab assessment – Electronic time devices
-> Field assessment – short distance sprint

5. Power- “Ability of a muscle or group of muscle to generate maximal force in a single effort”
-> Lab assessment - EMG analysis, force platform
-> Field assessment – Vertical jump, softball throw for distance

6. Reaction time / movement- “Ability to respond rapidly to a stimulus”
-> Lab assessment- Electronic devices
-> Field assessment – Reaction time stick tests.
Motor ability

“The immediate capacity of an individual to perform in many varied stunts or athletic events”

“The present acquired and innate ability to perform motor skills of a general or fundamental nature, explosive of highly specialized sports or gymnastic techniques” - Barrow and Mcgee.

Motor learning

“Motor learning is the process of acquisition, refinement, and stabilization of motor actions”

“persistent change in movement behavior potentiality as a result of practice or experience”

Physiological components of physical fitness

1. Physiological fitness
2. Metabolic fitness
3. Morphological fitness
4. Bone integrity (Bone strength)

Physiological fitness- “It includes non-performance components of physical fitness that relate to biological systems that are influenced by one’s level of habitual physical activity”

Metabolic fitness- “The state of metabolic systems and variable predictive of the risk of diabetes and cardiovascular disease which can be favorably altered by increased physical activity or regular endurance exercise”

Metabolic fitness included sub-components such as blood sugar levels, blood lipid levels, and blood hormone levels. It is now clear that lower levels of physical activity than recommended may reduce the risk for certain chronic degenerative diseases and improve metabolic fitness.
Morphological fitness - “It is related to body composition factors such as body circumferences, and fat content and regional body fat distribution”

-> Assessment- Measures used to assess body composition are also used to assess morphological fitness such as body mass index, waist circumference, and waist to hip ratio.

Bone integrity (Bone strength) - “It is related to bone mineral density, bone integrity is related to habitual physical activity”

Assessment – Measurement is expensive and requires special instrumentation and a high degree of expertise, there are no currently used field measures that are used extensively.

Sports related components of physical fitness
  o Team sport
  o Individual sport

“Sports related physical fitness is directed towards optimizing athletic performance, recreational activity, increasing ability to work, and avoidance of injury. It is directly related to performance in games and sports”

Basic consideration in motor fitness
  ✓ Body build
  ✓ Mental aspects
  ✓ Physical fitness
  ✓ Reaction time
  ✓ Movement time
✓ **Body build**

<table>
<thead>
<tr>
<th>Kretschmer</th>
<th>Identification</th>
<th>Sheldon</th>
<th>Personality Type</th>
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<tbody>
<tr>
<td>Based on the bodily structure</td>
<td>Based on their physical characteristics</td>
<td>Based on their Psychological characteristics</td>
<td></td>
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<tr>
<td>Pyknic(thick body)</td>
<td>7-1-1</td>
<td>Endomorph(inner layer)</td>
<td>Extravert</td>
</tr>
<tr>
<td>Athletic (thin body)</td>
<td>1-7-1</td>
<td>Mesomorph(middle layer)</td>
<td>Ambivert</td>
</tr>
<tr>
<td>Asthenic( lean body)</td>
<td>1-1-7</td>
<td>Ectomorph(outer layer)</td>
<td>Introvert</td>
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<tr>
<td>Dyplastic (abnormal bodies)</td>
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<th>Kretschmer</th>
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<tbody>
<tr>
<td><strong>Pyknic</strong> ( Greek word-Thick body) Short and thick, strong neck, barrel shaped chest and pot belly</td>
<td><strong>Endomorph</strong> ( Inner layer) It is developed viscera &amp; internal organs e.g intestine, lining of the stomach</td>
</tr>
<tr>
<td><strong>Athletic</strong> ( thin body) Muscular individual, broad shoulders and well developed chest.</td>
<td><strong>Mesomorph</strong> (middle layer) It is developed muscles and bones</td>
</tr>
<tr>
<td><strong>Asthenic</strong> (Lean body) Lean, shallow chested, tall in proportion, sloping shoulders.</td>
<td><strong>Ectomorph</strong> (outer layer) It is developed nervous tissues</td>
</tr>
<tr>
<td><strong>Dyplastic</strong> (abnormal bodies) These peoples are not found in the above the body types</td>
<td>-</td>
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</tbody>
</table>

✓ **Height**

Height is an advantage for the athletes to perform motor skill. Height is measured with the help of “stadiometer”. e.g Volleyball, Basketball
✓ weight

weight is one of the important factors for the athlete to perform motor skill well. Weight is measured with the help of “weighting machine”
e.g Motor skill well.

✓ Flexibility

The range of movement of a joint. This is very essential for athletes and swimmers. Infants show extraordinary trunk and joint flexibility, but gradually they lose this ability when they grow.
Flexibility can be increased by doing “asana”
Flexibility can be measured by using “Goniometre”

✓ Mental aspects

There is a positive relationship between “mental” (intellectual) and “motor” (non-intellectual) abilities of the individual, a relationship increases when departing from normality toward retardeness.

✓ Physical fitness

“The ability to carryout daily tasks”. “Physical fitness is the ability to do the daily tasks with vigor and alertness, without undue fatigue, and with ample energy to engage in leisure pursuit and to meet emergency situations”- H.Harrison Clarke

✓ Reaction time

“Chronoscope” is used to find out reaction time. The reaction time is
“The time elapsed between signal and start of the response”

Single \[\text{Beginning \text{ \textrightarrow \text{End of movement}}\text{ \textdownarrow \text{of movement} \textdownarrow \text{End of movement}}\text{ \textdownarrow \text{End of movement}}\] Reaction time Movement time

✓ Movement time

The movement time is “the time elapsed from starting of the movement to the end of movement”
e.g: in start, from the sprinters response to the completion of the race, the time recorded is the movement time. This caused by muscular force, there is a high relationship between reaction time and movement time.
✓ Reflex time

“Reflex is an automatic response, predictable and does not require perceptibility”

E.g if an athlete is standing at the starting block, the time elapsed from the stimulation to the initiation of movements in the reflex time. Reflex time is shorter than the response time. Because the involvement of brain is not here. But spinal cord controls this.

✓ Response time

This is “the time an individual takes to complete the entire movement and includes the reaction time, movement time and reflex time”

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