The effects of exercise on the body

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO1: Understand the effects of exercise on the body

Assessment criteria: The learner can:
1.1. Describe cardiovascular and respiratory adaptations to endurance / aerobic training
1.2. Identify the short and long term effects of exercise on blood pressure
1.3. Describe the “blood pooling” effect following exercise
1.4. Describe the effects of exercise on bones and joints including the significance of weight-bearing exercise
1.5. Describe delayed onset of muscle soreness (DOMS) and identify exercises or techniques likely to increase its risk
1.6. Describe the short and long term effects of different types of exercise on muscle
1.7. Describe different exercises that can improve posture
Revision

Thought storm

Name the components of:

- Health-related fitness
- Skill-related fitness
# Components of fitness

<table>
<thead>
<tr>
<th>Health-related fitness</th>
<th>Skill-related fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cardiovascular fitness</td>
<td>1. Speed</td>
</tr>
<tr>
<td>2. Muscular strength</td>
<td>2. Power</td>
</tr>
<tr>
<td>3. Muscular endurance</td>
<td>3. Reaction time</td>
</tr>
<tr>
<td>4. Flexibility</td>
<td>4. Co-ordination</td>
</tr>
<tr>
<td></td>
<td>5. Balance</td>
</tr>
<tr>
<td></td>
<td>6. Agility</td>
</tr>
</tbody>
</table>
Effects of exercise

**TASK**

How will exercise for specific fitness components affect the following body systems:

- Cardiovascular / respiratory
- Muscular
- Skeletal

Present ideas to the rest of the group
Cardiovascular adaptations (long-term)

- Stronger heart (cardiac muscle).
- Increased stroke volume.
- Increased cardiac output.
- More capillaries in the muscles.
- Waste products removed more efficiently.
- More mitochondria.
- Weight management assisted.
- Risk of cardiovascular disease (CV) is reduced.
- Blood pressure normalised.
Blood pressure

**Short term** (immediate):
- An increase in blood pressure in line with exertion

**Long term:**
- Aerobic exercise can bring about an average decrease in pressure of 10mmHg

NB: Weight training, circuits or strength work has not been shown to reduce blood pressure in isolation
Blood pooling

• During exercise there is an increased blood flow

• If activity stops suddenly the heart will continue pumping at an elevated rate

• Without skeletal muscular contraction, blood will begin to pool in the limbs, e.g. legs

• Symptoms may include nausea, dizziness and fainting

Tips:
• Cool down thoroughly to lower heart rate
• Keep legs moving during cardiovascular exercise to improve venous return
Skeletal adaptations

Short term:
• Increase in synovial fluid to lubricate joints
• Increase blood circulated (bones have blood supply)

Long term (weight-bearing exercise):
• Stronger ligaments
• Increased bone density
• Reduced bone loss associated with age
Question and answer

Can you?

• Give an example of a weight-bearing exercise?

• Give an example of a non-weight-bearing exercise?
Muscular adaptations

Short term:
- Vasodilation
- Diversion of blood to the working muscles
- A temporary ‘pump’ or increase in muscle size due to circulation

Long term:
- Improved motor fitness and greater efficiency of movement
- Enhancement of neuromuscular connections and motor unit recruitment
- Change in muscular properties, e.g. hypertrophy
- Improved flexibility
- Improved posture
Exercise effects

Aerobic exercise:
Lower intensity, long duration exercise primarily stimulates Type I muscle fibres to:
  • Increase the number and size of mitochondria
  • Increase the number of capillaries surrounding these fibres
  • Increase the amount of aerobic enzymes, stored glycogen and triglycerides within muscle tissue

Resistance training:
• Short duration, higher intensity exercise primarily stimulates Type II muscle fibres to:
  • Increase the diameter of muscle fibres (hypertrophy)
  • Increase the glycolytic activity of the muscle
**Delayed Onset of Muscular Soreness (DOMS)**

Soreness or stiffness experienced in muscles typically between 12-72 hours after exercise

It is particularly common:

- At the beginning of a new exercise programme
- Following increased eccentric loading
- Following an increase in intensity of a training programme
- Following the introduction of unfamiliar movement patterns
Thought storm

What factors will affect posture?
Factors that affect posture

- Age
- Fashion
- Sport
- Self-esteem and confidence
- Sedentary lifestyle, e.g. driving, desk
Thought storm

What type of exercises and activities may help to compensate and improve posture?
General exercise for posture

To help compensate include:

• Full range of movement exercises
• Compound movement patterns
• Free-standing posture
• Free-weight and cables (gym)
• An equal number of push and pull exercises
• Dynamic stretches
• Developmental stretches
Posture

**TASK**

What muscles may need to be strengthened or lengthened/stretches to improve the following posture types?

- Hyperkyphotic
- Hyperlordotic
- Flat back
Exercise for postural deviations

Hyperkyphosis

- Strengthen lower and middle trapezius.
- Strengthen rhomboids.
- Lengthen pectorals, anterior deltoid.
- Lengthen upper trapezius.
- Mobilise thoracic spine.
Exercise for postural deviations

Flat back

• Strengthen deep core stabilisers.
• Strengthen and activate gluteals.
• Mobilise spine, especially extension.
• Stretch hamstrings and rectus abdominis.
Exercise for postural deviations

Hyperlordosis

• Strengthen abdominal muscles.
• Strengthen deep core stabilisers.
• Lengthen hip flexor, hamstrings and spine extensors.
• Mobilise spine, especially flexion.
Quiz

1. State one cardiovascular adaptation to endurance/aerobic training (1 mark)
2. State one respiratory adaptation to endurance/aerobic training (1 mark)
3. State one short-term effect of exercise on blood pressure (1 mark)
4. State one long-term effect of exercise on blood pressure (1 mark)
5. What is “blood pooling”? (1 mark)
6. How can the risk of blood pooling be minimised? (2 marks)
7. State one effect of exercise on bones and joints. (1 mark)
8. Give an example of a weight-bearing exercise. (1 mark)
9. Give an example of an activity that is NOT weight-bearing. (1 mark)
10. What is delayed onset of muscle soreness (DOMS)? (1 mark)
11. What type of exercises are likely to increase the risk of DOMS? (1 mark)
12. State one short-term effect of exercise on the muscles. (1 mark)
13. State one long-term effect of cardiovascular exercise on muscles. (1 mark)
14. State one long-term effect of flexibility training on muscles. (1 mark)
15. State one long-term effect of muscular strength training. (1 mark)
16. What exercises can improve posture? (2 marks)

Total marks 18 /18
Learning review

**Assessment criteria:** Can you now:

- Describe cardiovascular and respiratory adaptations to endurance/aerobic training
- Identify the short and long-term effects of exercise on blood pressure
- Describe the “blood pooling” effect following exercise
- Describe the effects of exercise on bones and joints including the significance of weight-bearing exercise
- Describe delayed onset of muscle soreness (DOMS) and identify exercises or techniques likely to increase its risk
- Describe the short and long-term effects of different types of exercise on muscle
- Describe different exercises that can improve posture