



UNIVERSITY OF PÉCS
MEDICAL SCHOOL



SPORTMED
PTE ÁOK SPORTMEDICINA TANSZÉK

Monitoring sports performance

Practice-oriented sport medicine

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PTE464

<http://potecho.pte.hu>

spring semester 2024, Pécs

Sport performance

Genetic factors

Environmental factors

Sport performance

Training techniques

Biomechanical function

Practice

Emotional factors

Physiological factors

Level of physical abilities

Physical performance - Classification of physical abilities

Conditional physical abilities:

1. Endurance
2. Force (strength)
3. Speed

Flexibility

Coordinational physical abilities:

1. Ability to differentiate (coordination)
2. Coupling or synchronization capacity
3. Rhythm ability or rhythm
4. Balancing ability
5. Readaptation or change capacity
6. Guidance capacity
7. Reaction capacity

Special abilities

Other aspects of the sport performance

Fitness definition and types

Howley & Franks (2007) as “a state of well-being with a low risk of premature health problems and energy to participate in a variety of physical activities.”

Types:

Skill-related fitness (agility, balance, coordination, speed, power)

Health-related fitness

Healthy person < Trained (fit) person < Competitive athletes

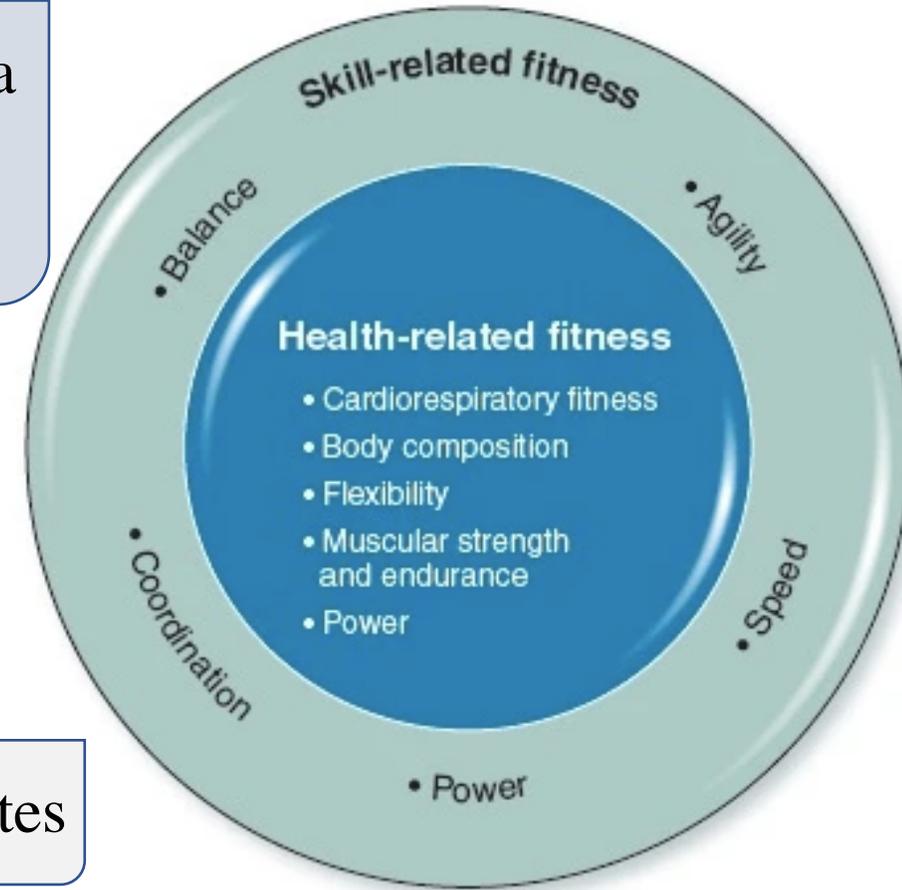


FIGURE 14.1 Components of physical fitness.

The most frequently measured components of physical performance



Components of physical performance (or health related physical fitness):

1. muscular endurance
2. cardiovascular endurance
3. muscular strength /force
4. body composition
5. flexibility

Need for measurements:

- Aim / aims of the measurement
- Participants (age, gender, sport habits, health status)
- Available devices, infrastructure and professionals

Measurement of physical performance (Premier League fitness test)



<https://www.youtube.com/watch?v=4FtmxYFhnT4>

Physical abilities	Name of the test
Speed	
Strength endurance (static)	
Endurance (field test)	
Agility, speed	
Strength endurance (dynamic)	
Strength of lower limb/ explosive strength	
Endurance (laboratory test)	

Measurement of physical performance (Premier League fitness test)



Physical abilities	Name of the test
Speed	10, 20, 30 m sprint
Strength endurance (static)	Plank test
Endurance (field test)	Beep test (20 m shuttle run test)
Agility, speed	5-0-5 agility test
Strength endurance (dynamic)	Max push up test
Strength of lower limb/ explosive strength	Vertical jump test
Endurance (laboratory test)	VO ₂ max test

Purposes of physical performance measurements

1. Measurement of actual physical performance:

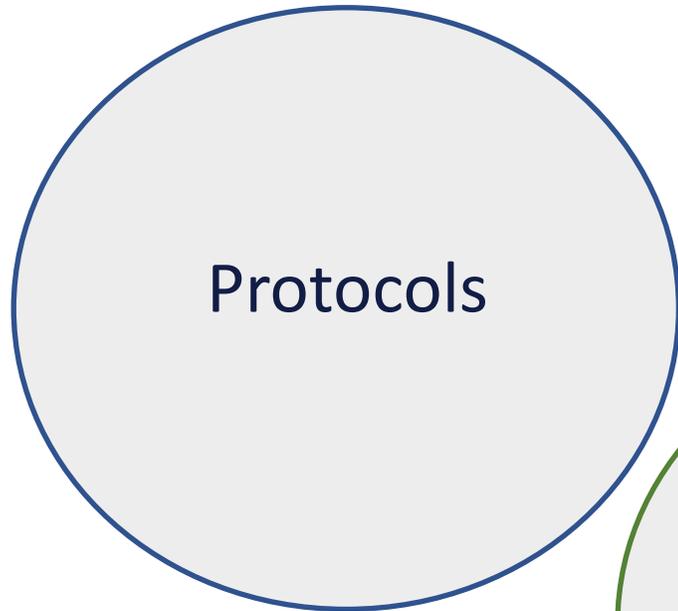
- Screening athletes with physical tests (professional athletes: after sport injury and rehabilitation, end of summer holiday, or patients before change in lifestyle etc.)
- Measurements for sport science researches

2. Regular physical performance measurement and follow-up:

- For creating an individual training plan
- For measuring the effectiveness of the training
- Measurements for sport science researches

Principles of physical performance measurement

The four P's:



Steps of physical performance measurement

1. Create protocol, ethical permission
2. Participants (recruit, informed consent)
3. Anamnesis, collection of training and sociodemographic data
4. Sport anthropometric measurements
5. Measuring actual physical abilities (according to standardized protocols)
6. Evaluation of measured results

Endurance

Endurance: ability to maintain muscle movement for an extended amount of time

Cardiovascular endurance: ability to deliver oxygen to working muscles, where it can be used to produce energy. VO_{2max} is a good marker.

Muscular endurance: ability to maintain contracting a muscle, against resistance for an extended period of time.

Types:

- Aerobic endurance
- Anaerobic endurance
- Strength endurance
- Speed endurance etc.

Measuring of endurance

- Field tests E.g. Cooper test, 20-meter shuttle run test
<https://www.youtube.com/watch?v=Ko1qHVN7DXo>
- Laboratory test E.g. spiroergometric test – like Bruce protocol

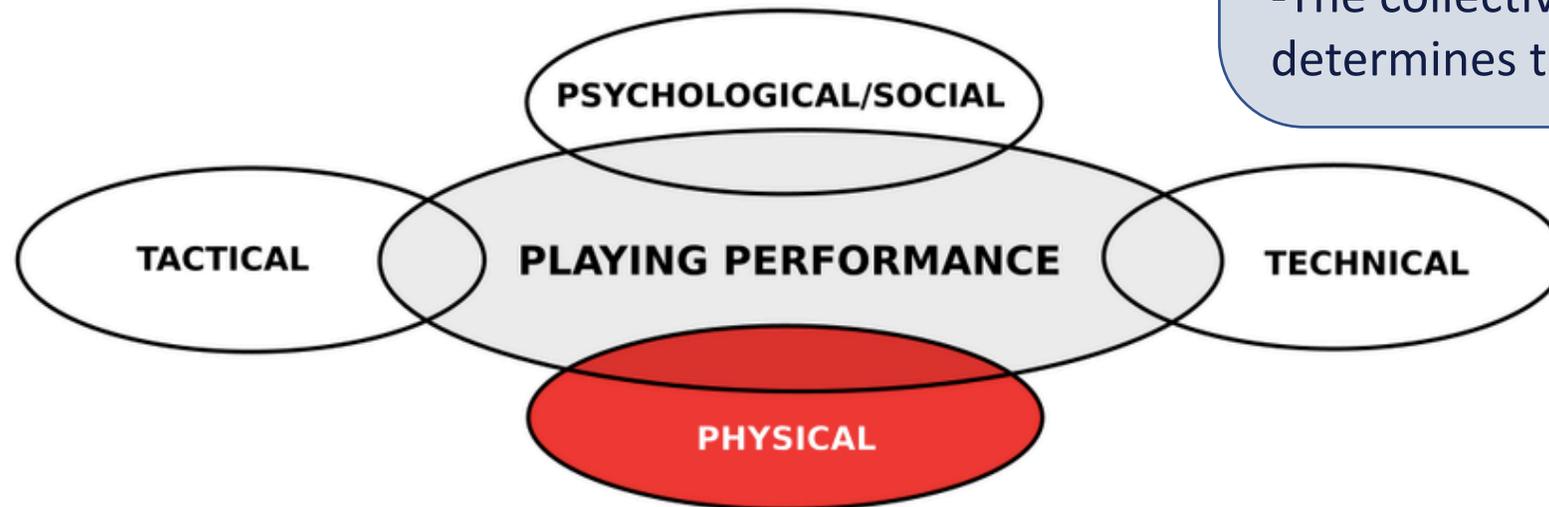
<https://www.youtube.com/watch?v=g3msO9bLODg>

Handball



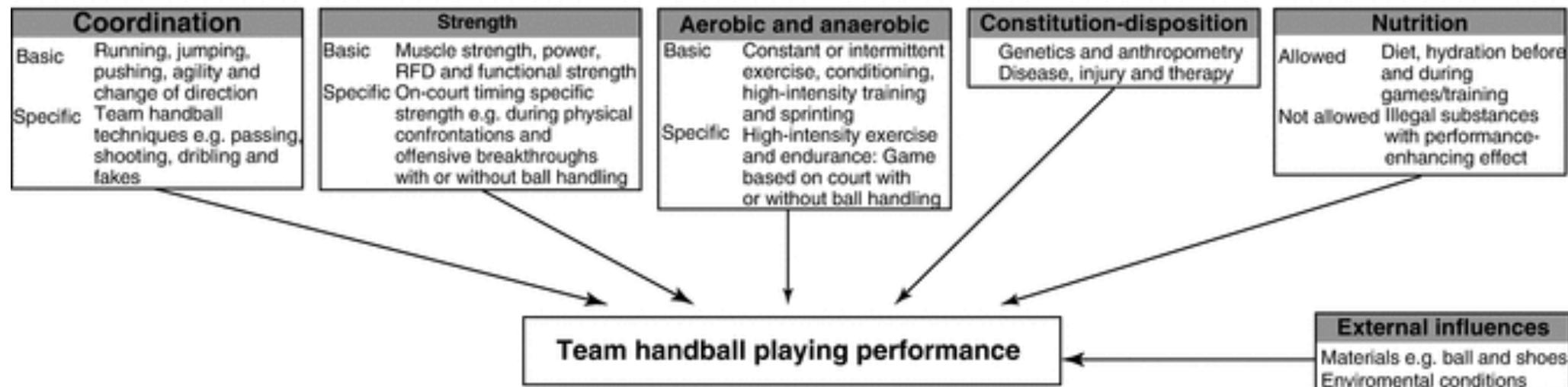
Factors complicating the measurement:

- Multifactorial aspects (physical, psychological, technical, tactical)
- Different positions require different physical abilities
- The collective performance of the team determines the final result



Handball

Individual performance

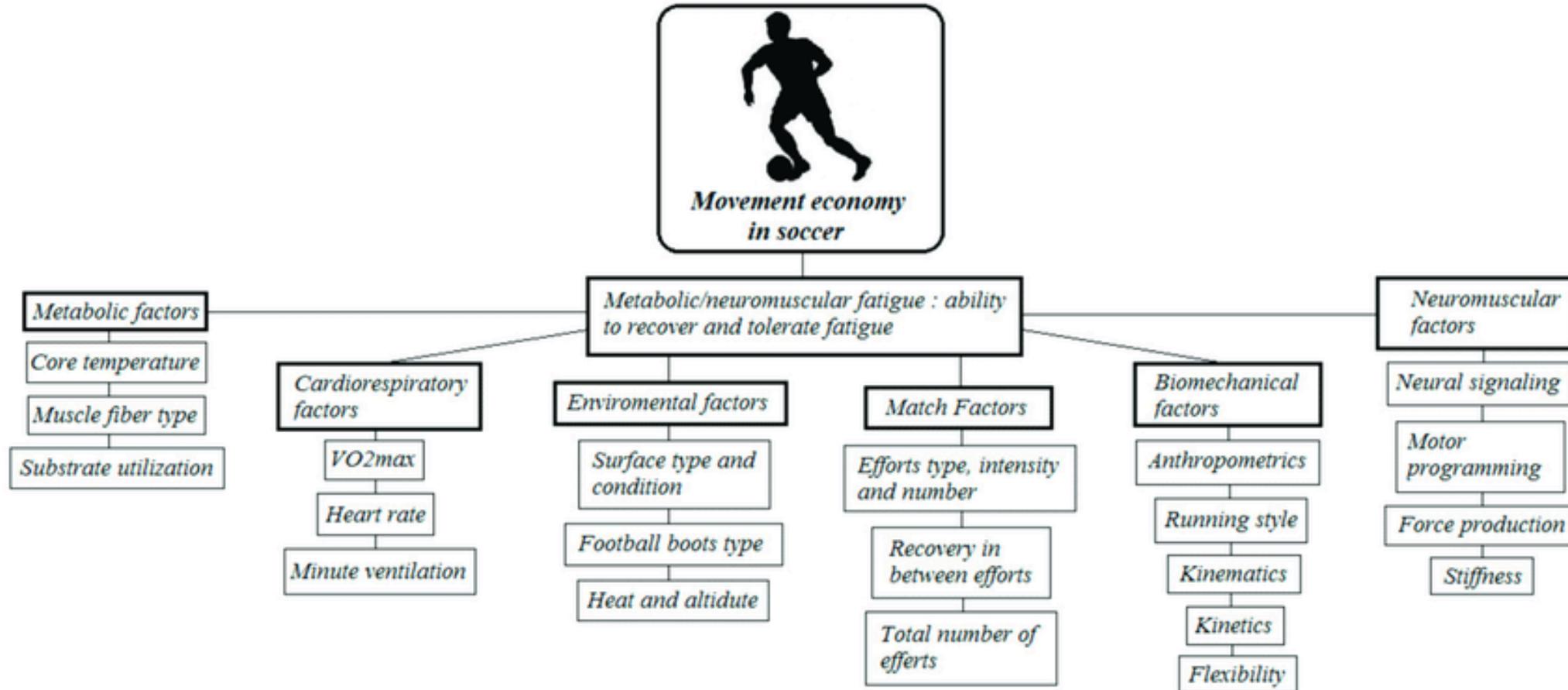


Team performance

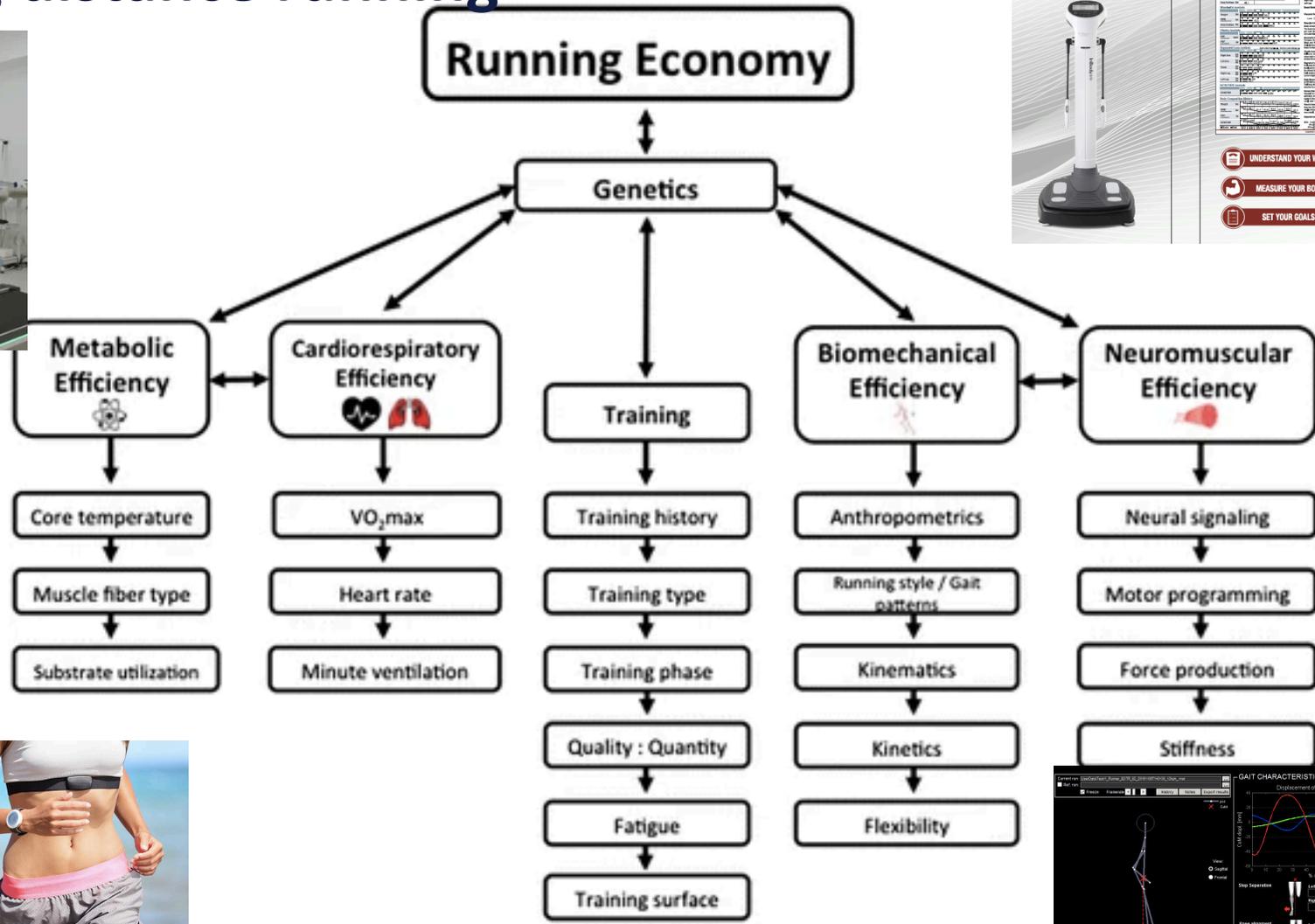
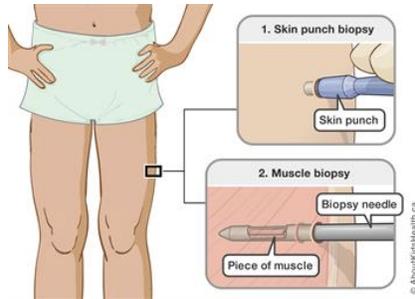


Football

Factors complicating the measurement:
-Roughly same as in handball



Middle and long distance running



Work of the sports scientist

<https://www.youtube.com/watch?v=v9s0d5bazS0>





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Thank you for your attention.



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