



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

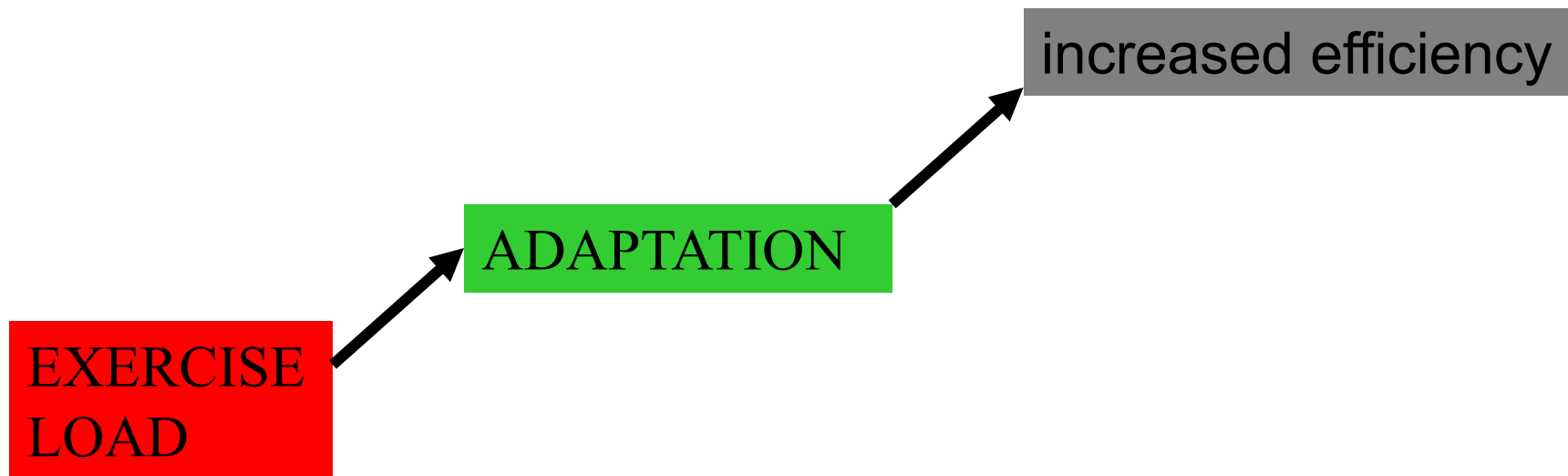
# PHYSICAL PREPARATION

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Projekt: Zvyšování jazykových kompetencí pracovníků FSpS MU a inovace výuky v oblasti kinantropologie, reg.č.: CZ.1.07/2.2.00/15.0199

# PHYSICAL PREPARATION

- Is generally focused on developing motor abilities
- Adaptive changes can be achieved by repeated application of Exercise load.



# PHYSICAL PREPARATION



- General preparation works on all motor abilities used in non-specific manifestations

- Consisting of the application motor abilities in specific sports disciplines

STRENGTH      SPEED

ENDURANCE

KOORDINATION

Means of development

**MOTOR ABILITIES**



**PHYSICAL EXERCISE**

# TRAINING OF STRENGTH ABILITIES



# STIMULATION OF STRENGTH ABILITIES

The ability to resist external resistance with muscle contraction represents a basic principle of developing the complex of **strength ability**.

- Overcomes the resistance of the equipment (lifting, throwing)
- Overcomes the resistance of the human body (gymnastics, jumping)
- Overcomes the resistance of the opponent (judo)
- Overcomes the resistance of the environment (swimming, rowing)

# Muscle contraction

Ca<sup>2+</sup>

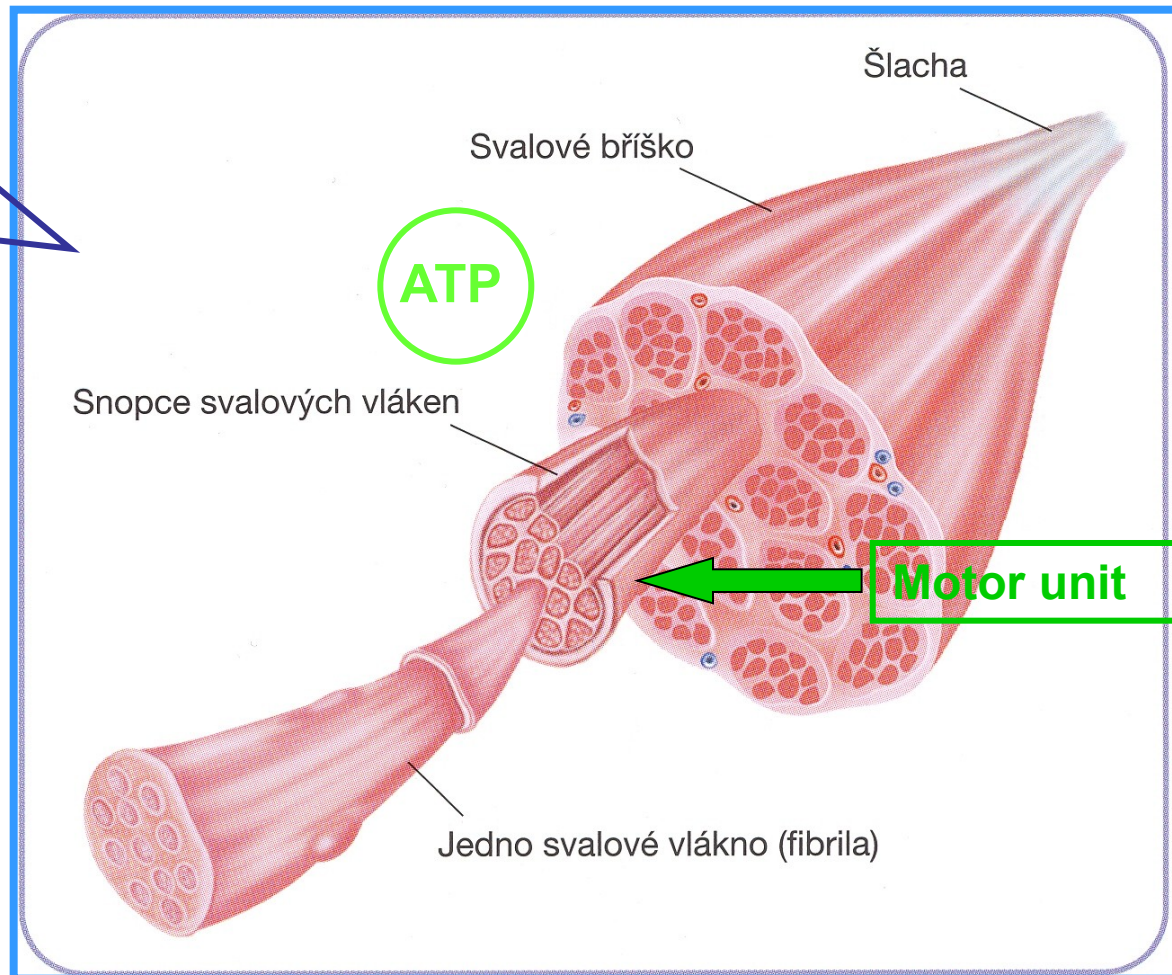
Actin

Myosin

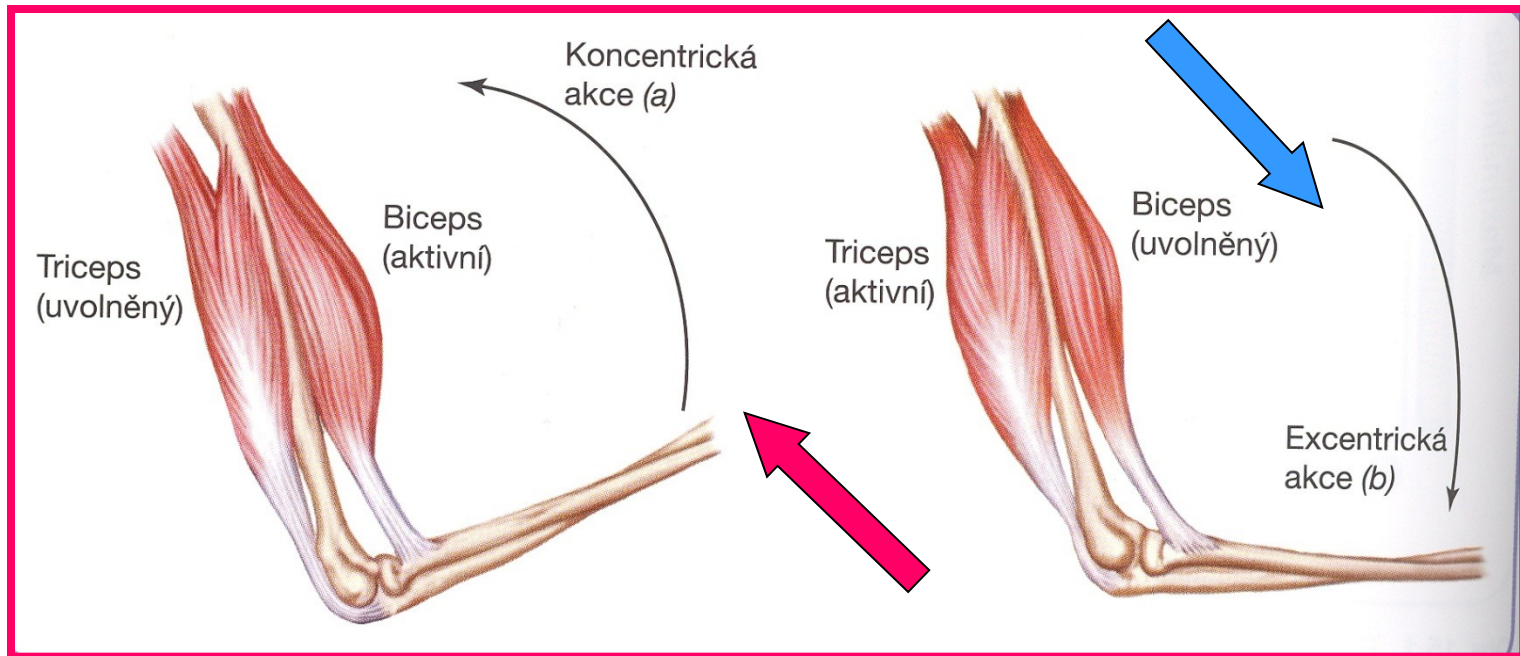
ATP

Motor unit

Inervation



## Functional muscle mechanics



**CONCENTRIC** contraction – muscle shortens

**EXCENTRIC** contraction – muscle extends

**ISOMETRIC** contraction – muscle length is the same, only the muscle strain changes

# Projevy svalové činnosti

**Maximal strength** is manifested by overcoming high or even limit external resistance at a slow speed with a specific muscle group usually in one repetition (e.g. in benchpress).

**Explosive strength** is manifested by overcoming low external resistance or weight of own body with maximal acceleration in single (acyclic) movement of participating segments (e.g. in throws, or take-offs).

**Reactive strength** is an ability to carry out muscle performance in motor activities which use stretch shortening cycle (SSC) with duration up to 200ms from beginning.

**Endurance strength** is manifested by repeated overcoming relatively low resistance at slow speed and multiple cyclic movements (e.g. cross-country skiing, sculling etc.)



# Účinek silového tréninku

**Strength development** is understood as an improvement in absolute or relative values of overcome external resistance at constant number of repetitions for specific muscle groups or exercises.



**Muscle hypertrophy development** represents increase in crosscut of active muscle fibre.

**Net power output development at acyclic movement** means improvement of optimum combination of speed of applied strength for dominant muscle groups in specific motor activities.

**Net power output development at cyclic movement** means improvement of optimum combination of speed of applied strength for dominant muscle groups in specific motor activities for a necessarily long period.

**Muscle endurance development** represents improvement in strength manifestation of specific muscle groups in activities that last for a relatively long period without declining intensity.

představuje zlepšení silového projevu konkrétních svalových skupin v činnostech po relativně dlouhou dobu bez snížení její intenzity.

# Relationship among specific parameters

	<b>dominant parameter</b>		
Strength	<b>load</b>	<b>number of repetition</b>	<b>velocity of movement</b>
Hypertrophy	<b>load</b>	<b>number of repetition</b>	<b>velocity of movement</b>
Power: Single effort event	<b>velocity of movement</b>	<b>load</b>	<b>number of repetition</b>
Multiple effort event	<b>velocity of movement</b>	<b>number of repetition</b>	<b>load</b>
Muscular endurance	<b>number of repetition</b>	<b>velocity of movement</b>	<b>load</b>

# Overview of methods of strength development

## ● **Methods with a maximum resistance**



The method of maximal effort  
The method of brakes of movement

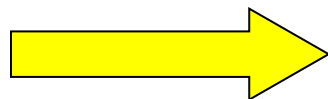
## ● **Methods without a maximum resistance**

### **Methods without a maximum speed of movement**



The method of intermediate  
The method of repeated efforts  
The method of strength endurance

### **Methods with a maximum speed of movement**



The method of speed  
The method of plyometric



MINISTERSTVO ŠKOLSTVÍ,  
MLÁDEŽE A TĚLOVÝCHOVY



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Thank you for your attention