Izmir *(Turkey)*

2007 EHF Youth Coaches' Seminar

Improving Strength without loosing coordination

Marta Bon

Organizasyon

The physical preparation is worked of two ways (Garcia, 2007)

- general physical preparation.

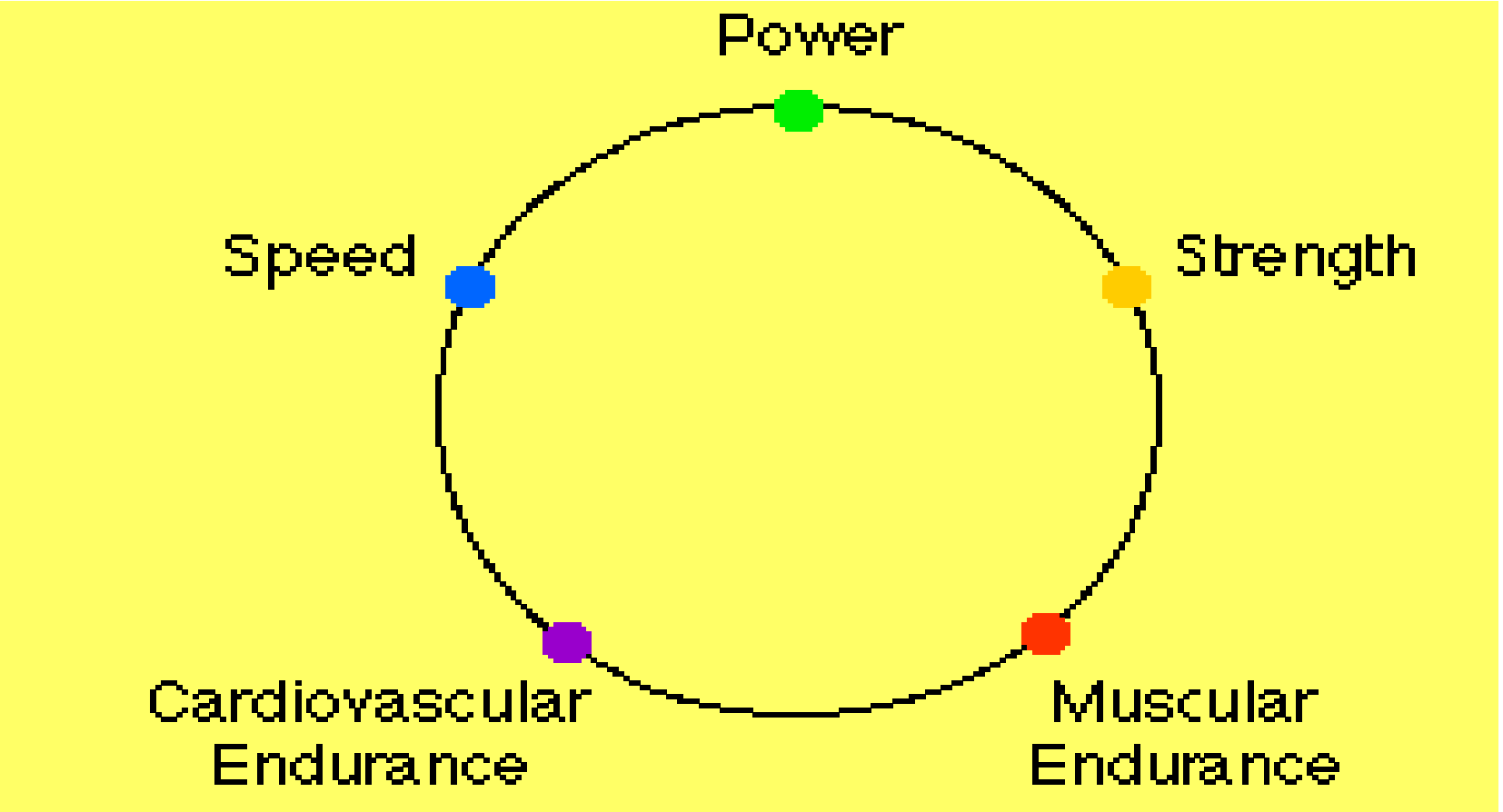
- specific physical preparation

Marta Bon

HANDBALL/ Fitness Components

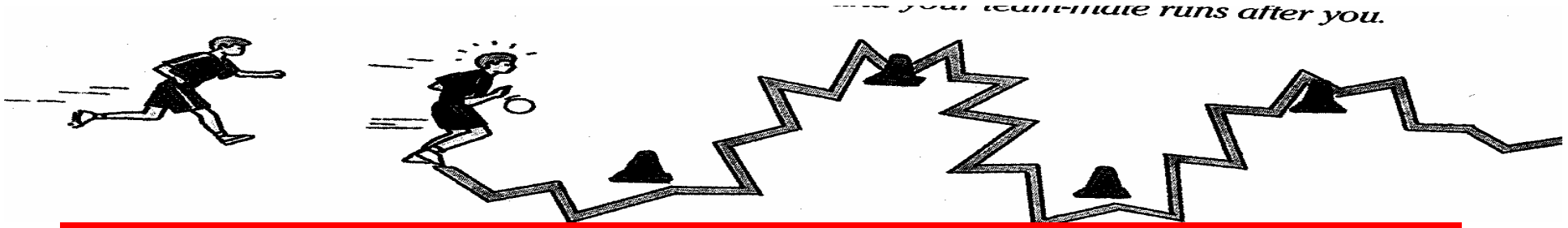
- Body Composition
- Cardiovascular Endurance
- Muscular Strength
- Muscular Endurance
- Flexibility
- Power
- Speed & Quickness
- Agility
- Balance
- Motor Skill

Conceptual Continuum

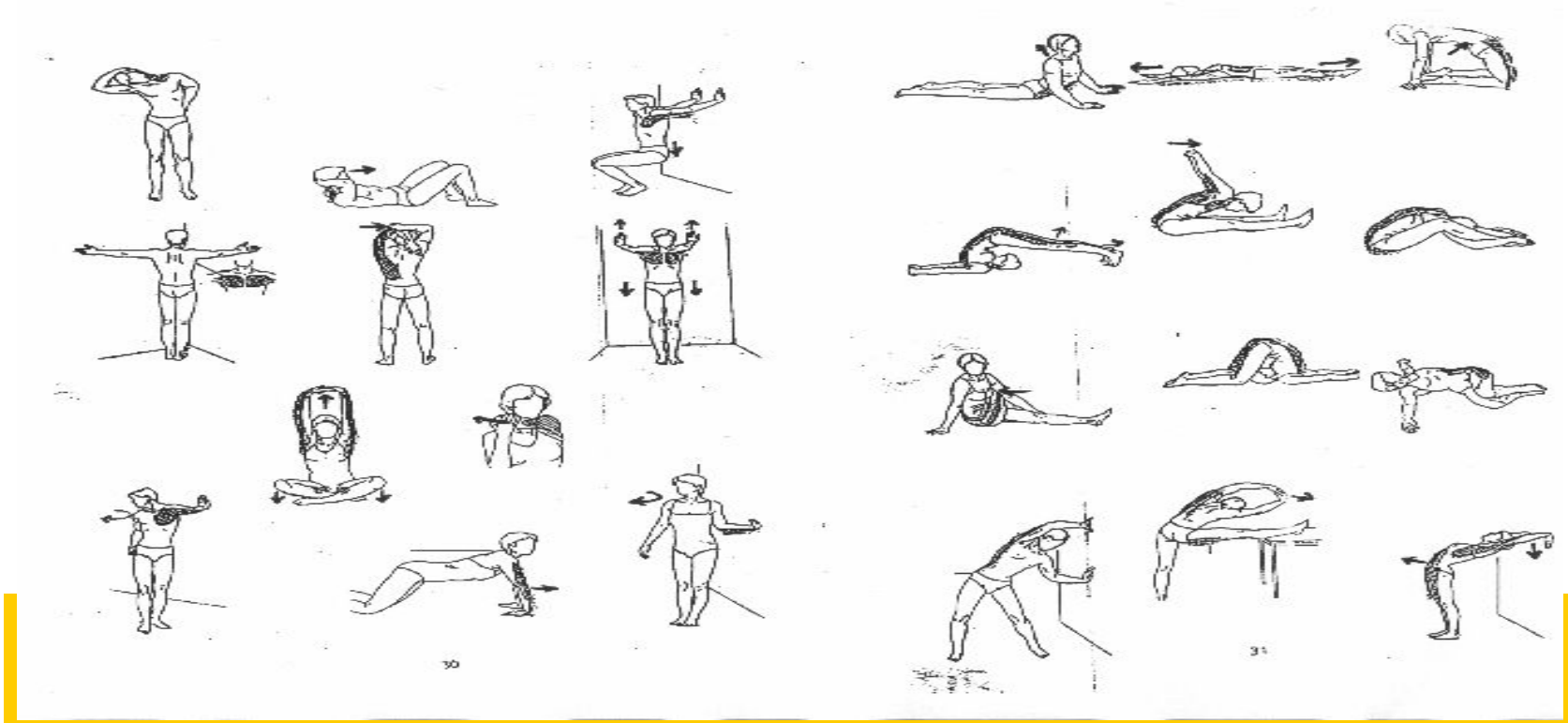


Improving

Strength ?



Improving Strength…..



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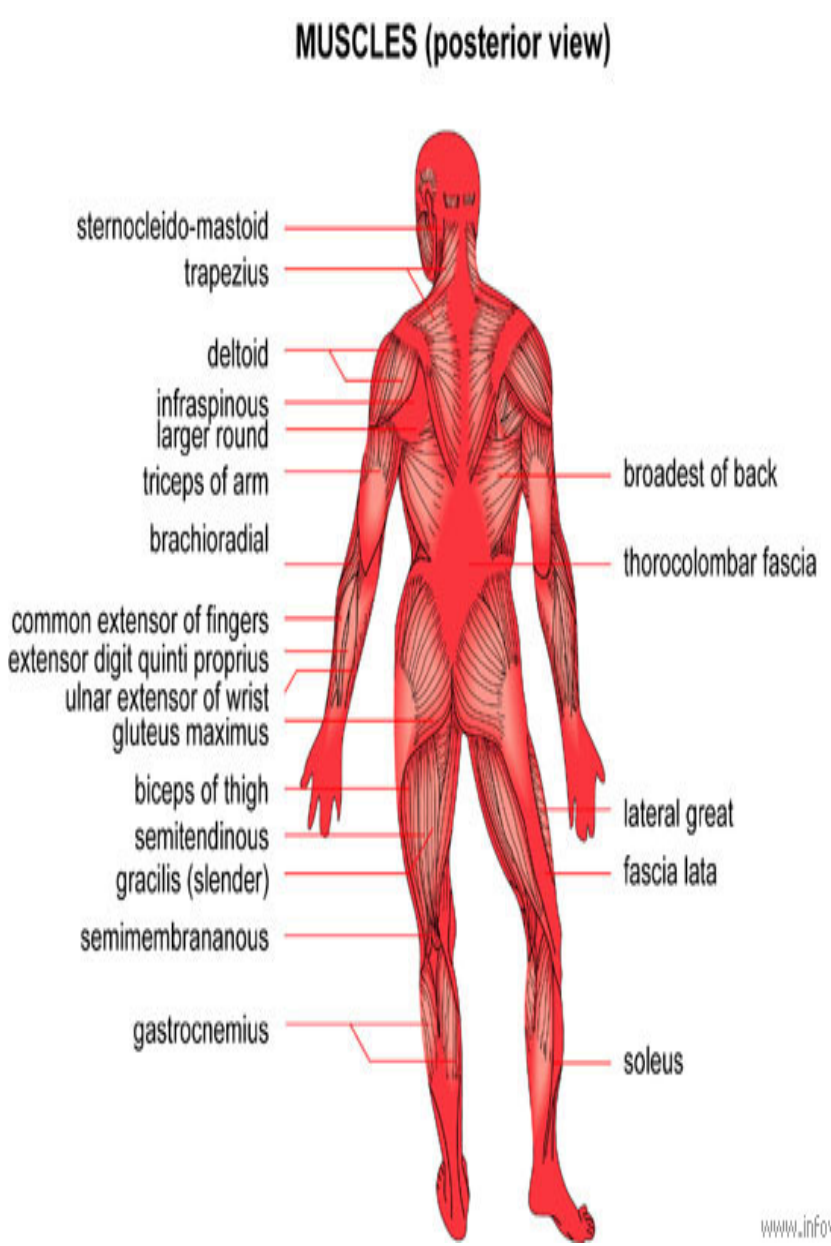
MUSCLES (posterior view)
sternocleido-mastoid
trapezius
deltoid
infraspinous
larger round
triceps of arm
brachioradial
common extensor of fingers
extensor digit quinti proprius
ulnar extensor of wrist
gluteus maximus
biceps of thigh
semitendinous
gracilis (slender)
semimembrananous
gastrocnemius
broadest of back
thorocolombar fascia
lateral great
fascia lata
soleus
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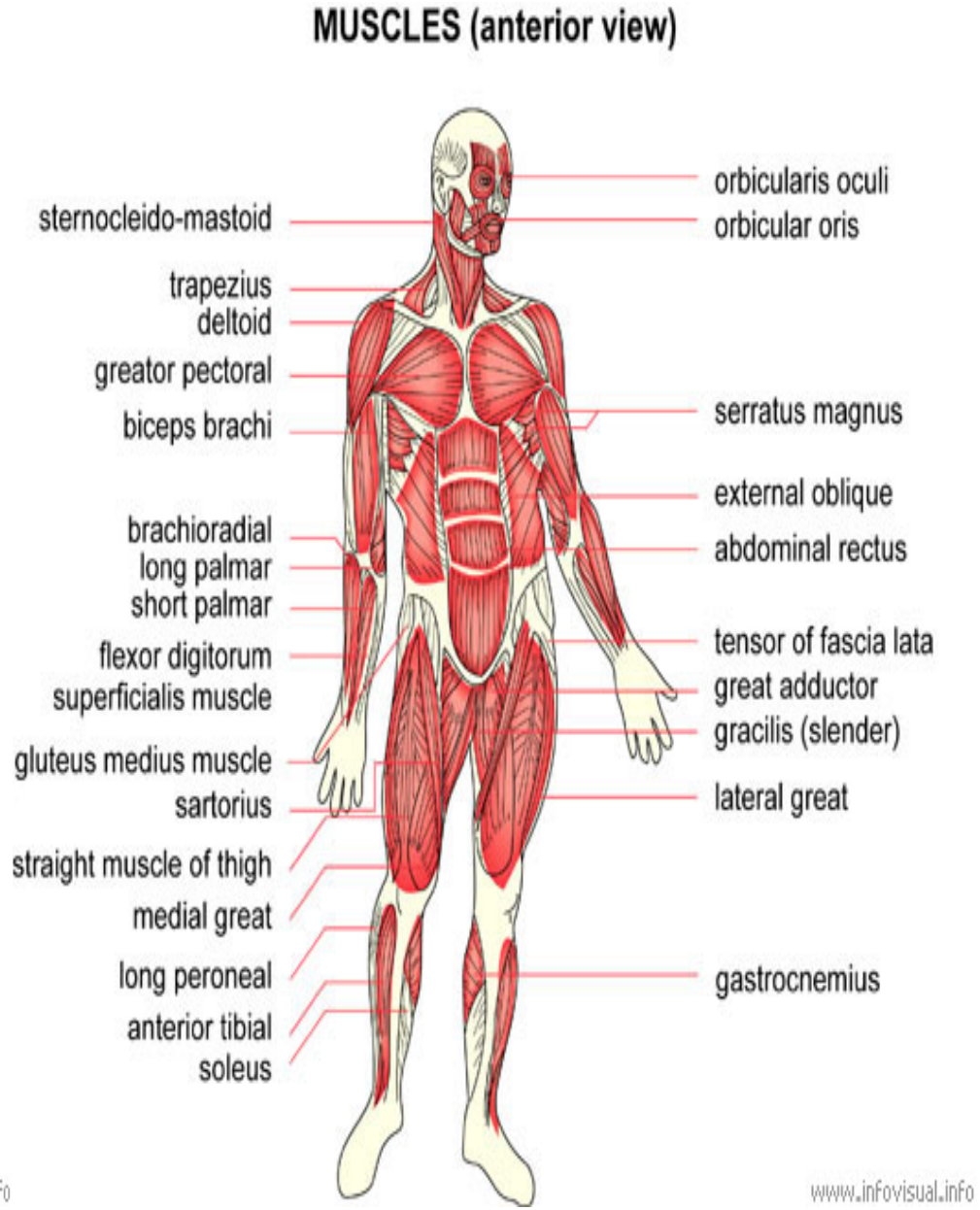
MUSCLES (anterior view)
sternocleido-mastoid
trapezius
deltoid
greator pectoral
biceps brachi
brachioradial
long palmar
short palmar
flexor digitorum
superficialis muscle
gluteus medius muscle
sartorius
straight muscle of thigh
medial great
long peroneal
anterior tibial
soleus
orbicularis oculi
orbicular oris
serratus magnus
external oblique
abdominal rectus
tensor of fascia lata
great adductor
gracilis (slender)
lateral great
gastrocnemius
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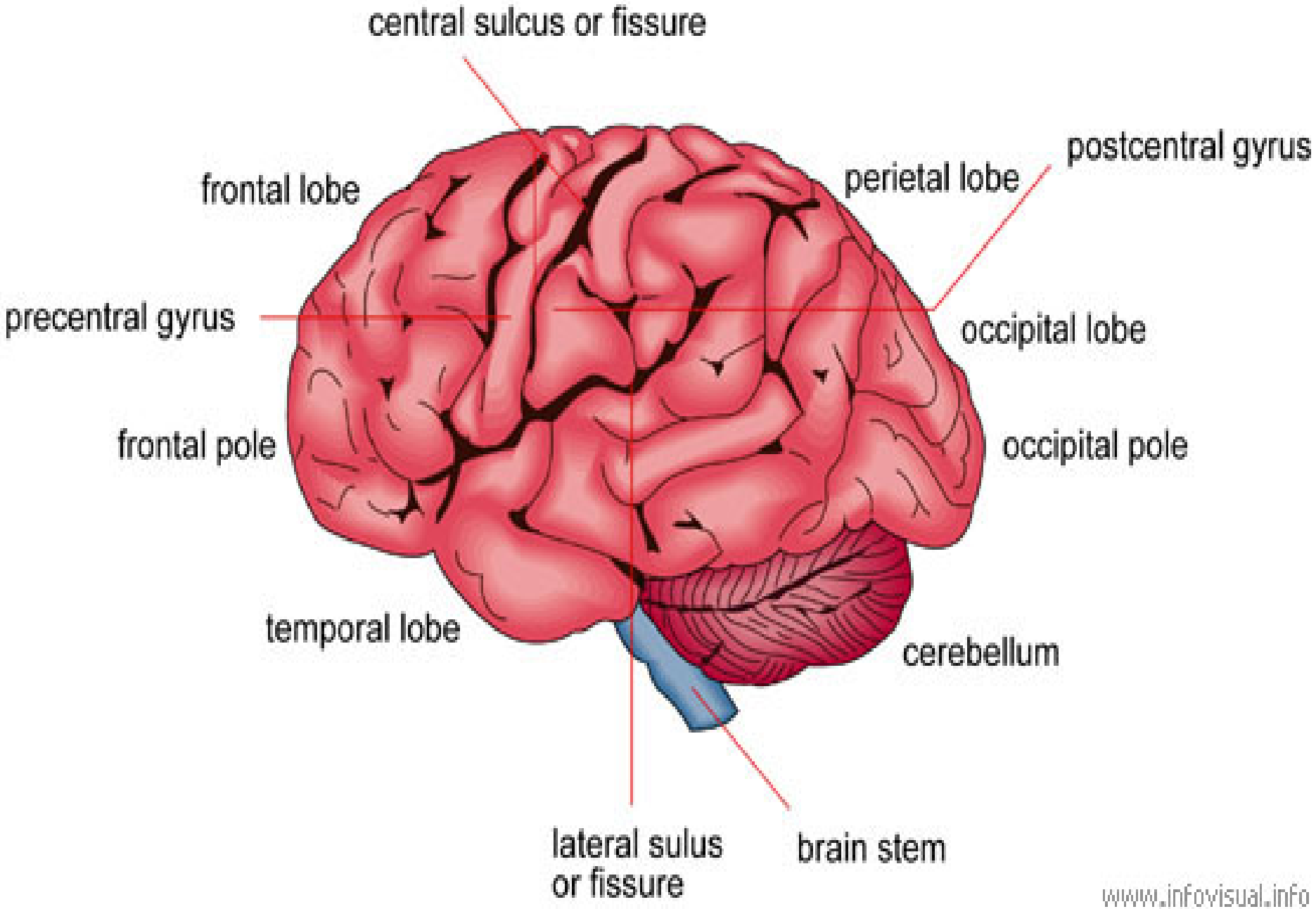
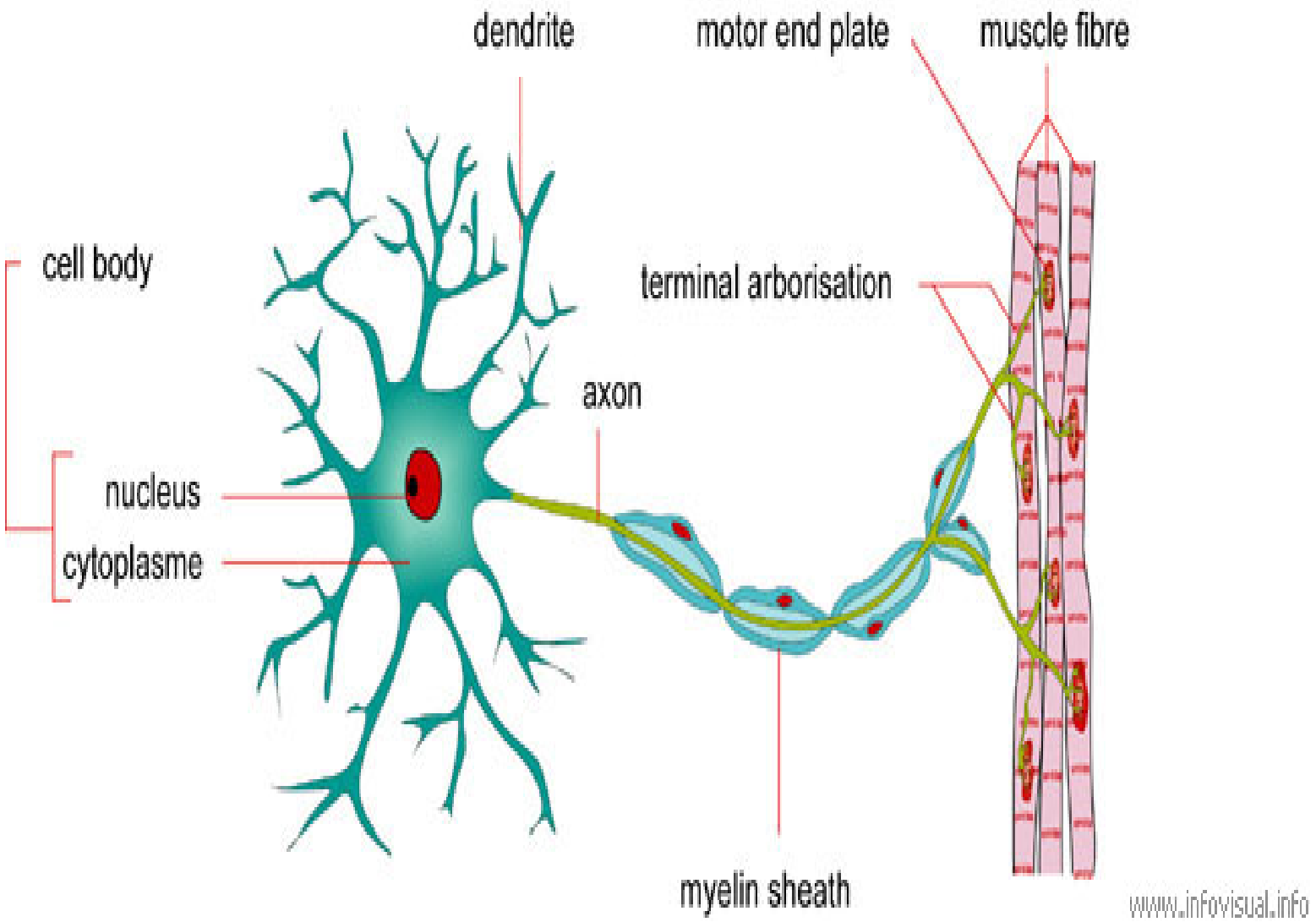
BRAIN OR ENCEPHELON (lateral view)



NEURON


dendrite
motor end plate
muscle fibre
cell body
terminal arborisation
axon
nucleus
cytoplasme
myelin sheath
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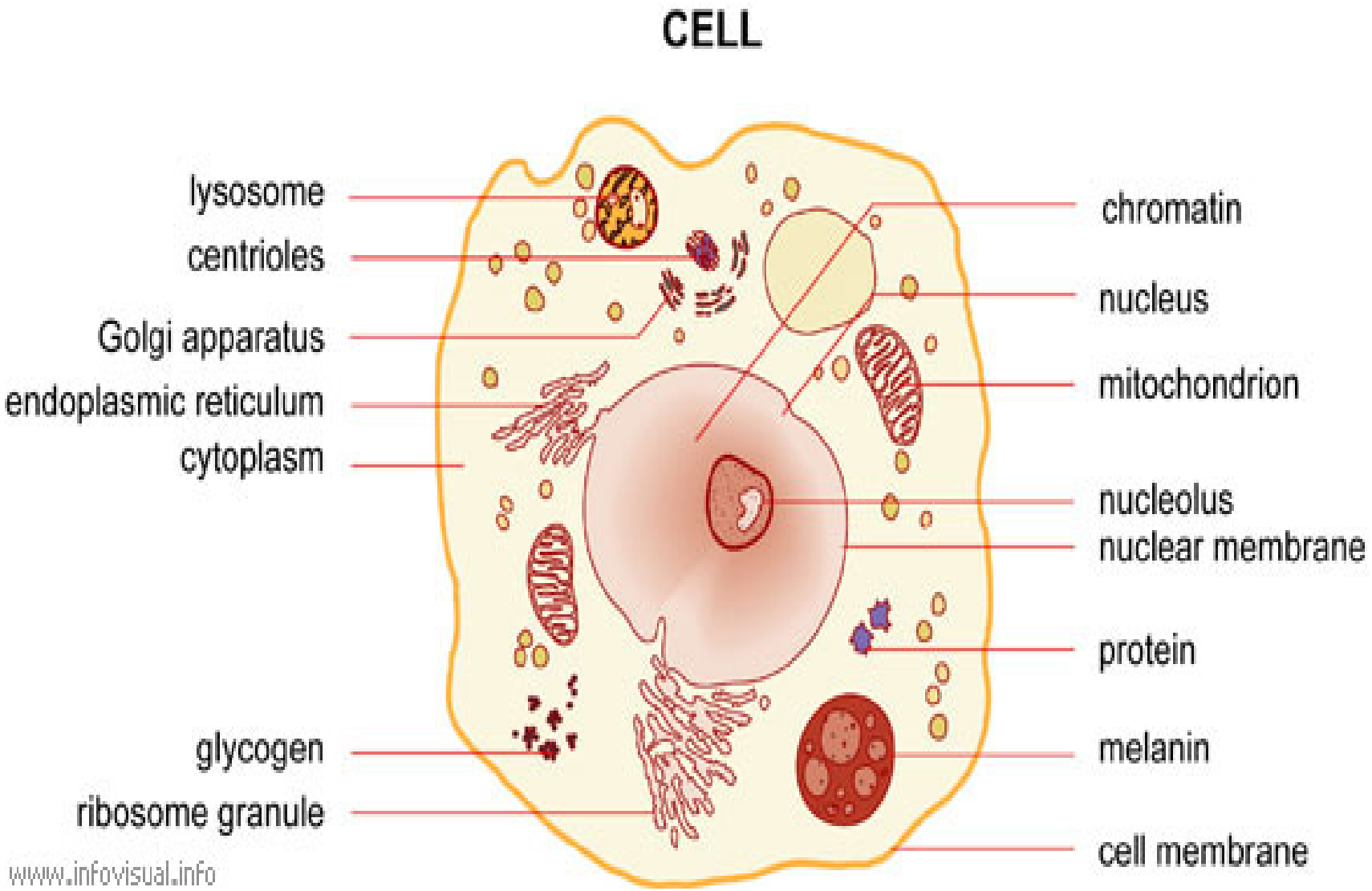
- **Cell**: the cell is a highly complex system that is the site of intense energy exchange and which presents vast interphase surfaces. Like all living organisms, it feeds itself, grows, multiplies and dies.



Contraction

- **Isotonic**
  - The contraction of a muscle with movement against a natural resistance. Isotonic actually means 'same tension', which is not the case with a muscle that changes in length and natural biomechanics that produce a dynamic resistance curve. This misnomer has prompted authors to propose alternative terms, such as dynamic tension or dynamic contraction.
- **Isokinetic**
  - The contraction of a muscle against concomitant force at a constant speed. Diagnostic strength equipment implement isokinetic tension to more accurately measure strength at varying joint angles.
- **Concentric**
  - The contraction of a muscle resulting in its shortening.
- **Eccentric**
  - The contraction of a muscle during its lengthening.
- **Dynamic**
  - The contractions of a muscle resulting in movement. Concentric and eccentric contraction are considered dynamic movements.
- **Isometric**
  - The contraction of a muscle without significant movement, also referred to as static tension. Also see Isometric Training.

Muscle Movement Classification

- **Agonist**
  - A muscle that causes motion.
- **Antagonist**
  - A muscle that can move the joint opposite to the movement produced by the agonist.
- **Target**
  - The primary muscle intended for exercise.
- **Synergist**
  - A muscle that assists another muscle to accomplish a movement.
- **Stabilizer**
  - A muscle that contracts with no significant movement to maintain a posture or fixate a joint.

In strength training an energetic component of movement is of importance,

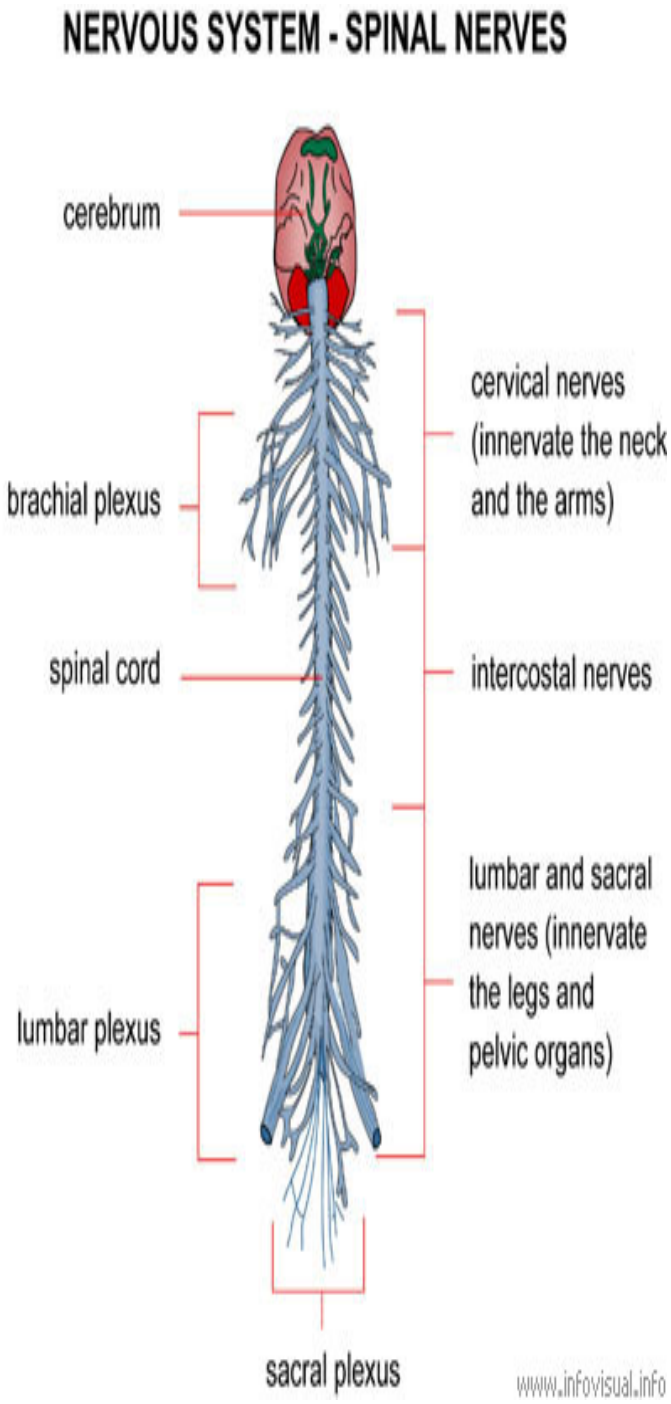
In coordination training has a dominant information component.

Therefore, it is possible that the effects of training exclude each other.

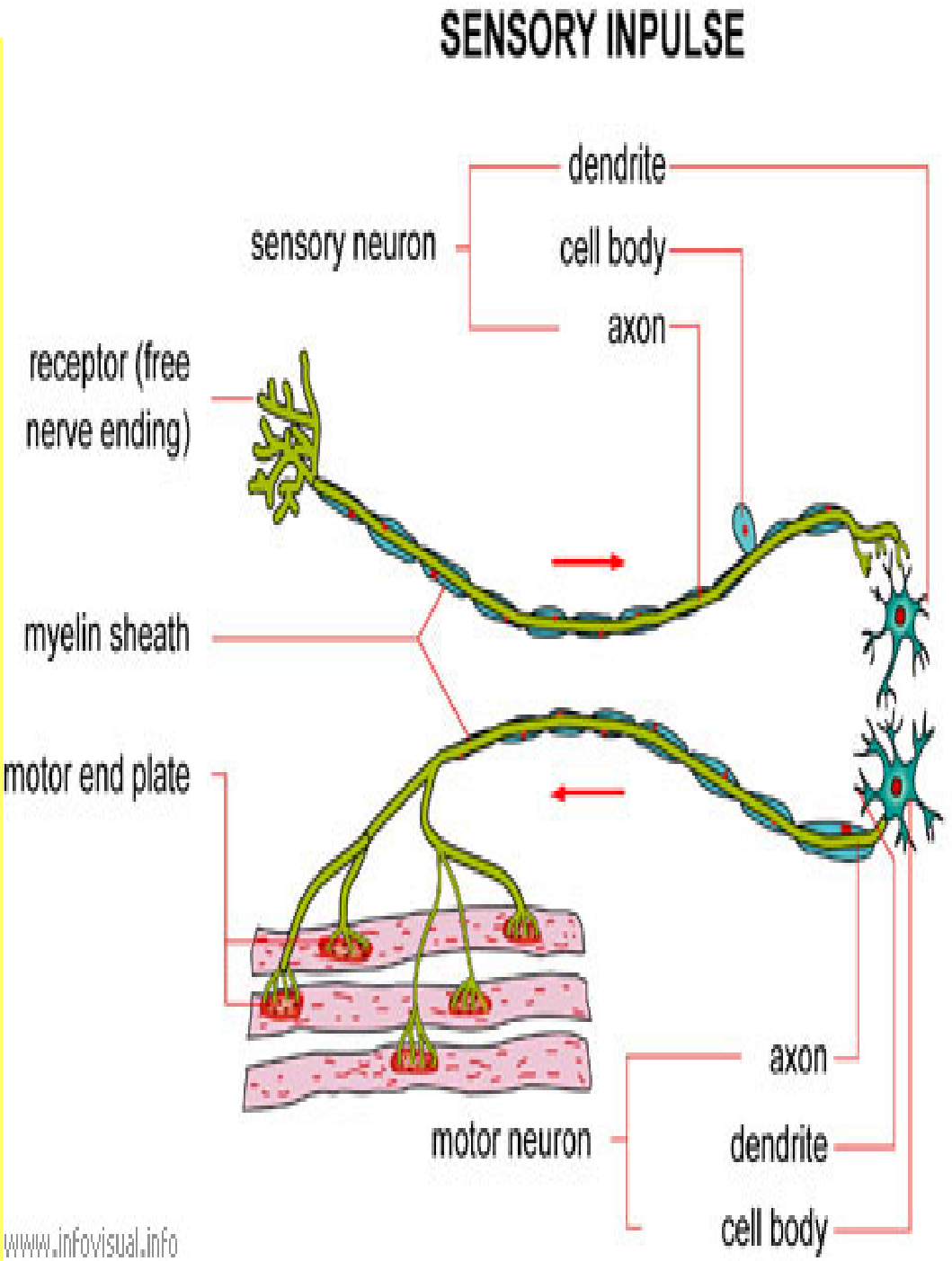
Coordination

- Coordination is the ability to efficiently form and perform complex motor tasks.
- The characteristic of well-coordinated movement is in being performed in the right moment with precision.
- The genetic influence on this ability is high, as with practice it can be only improved by 20%, compared to development in normal environment.
- Development of coordination can be significantly influenced from the childhood.

- **Coordination is among all the motor abilities the most connected with working of the central nervous system.**



Physiologically speaking the progress in muscular strength is a consequence of neural or muscular factors (Zatsiorsky, 1995).

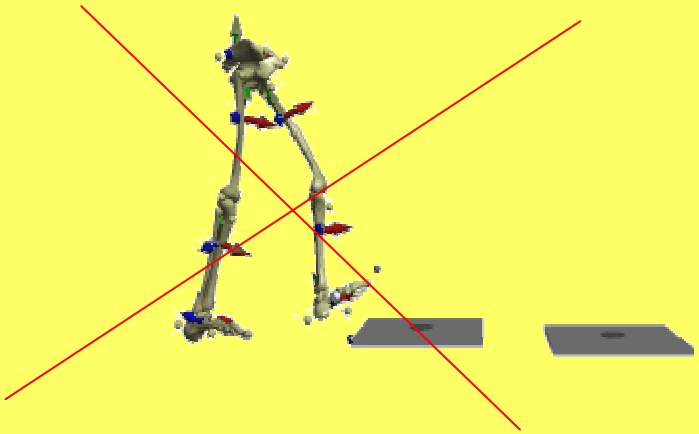


Coordination…other facts

- Learning every new movement influences the development of coordination.
- Wide basis of different motor experiences helps in acquiring new ones, as every new movement involves also previously acquired moves as well.

Coordination

- The more experience one has, easier and quicker he will acquire new tasks.
- It is very important to repeat movements in practice often, thus automating wide spectre of movements.



Strength ….definition

Strength is in physics defined as the ability to produce work in certain time interval.

Many sports disciplines, including handball, contain the movements (throws, jumps, sprints, quick changes of direction, hits) that depend on this motor ability. In these activities strength is one of the crucial factors of success (Kawamori, & Haff, 2004).

The structure of muscular strength

….depends on the aspect of its studying

1. according to manifestation (take-off, sprinting, throwing, putting…) and
2. topologic criteria (legs and pelvic girdle, torso, arms and shoulder girdle) or from the point of view of
3. the force of muscular contraction (maximum strength, speed strength, endurance in strength).

Adaptations in muscles

- ….occur later than adaptations in nervous system.

- The effects of hypertrophy can be seen only after three months of regular work and the same muscle group has to be loaded at least three times per week (Zatsiorsky, 1995).

Method: Activation

These methods do not influence the increase of muscle mass, rather they improve speed strength. Short lasting explosive maximum muscular effort is characteristic for these methods.

The loads used are maximal (more than 90%) and supra maximal (150%). This type of training has to be performed when a sportsman is not tired. The breaks between the series have to be long between 3 and 5 minutes (Fajon, 2007).

Method of max efforts

- Common characteristic of methods of maximum muscular efforts is the improvement of maximum strength mainly on the account of increasing the level of activation (improvement of intra-muscular coordination)

The methods of repeated sub-maximal I.

- contractions are intended mainly to increase the muscle mass.
- They also influence the improvement of maximal strength and strength endurance. Sub-maximal loads (60-80%) are characteristic of this method. The pace is slow and fluent. The key of these methods is to exhaust muscles.

mixed methods

- The main goal of mixed methods is to improve fast strength. These methods use short lasting explosive muscle efforts. Loads used are sub-maximal. This type of training has to be performed in rested conditions.

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Improving Strength without loosing coordination

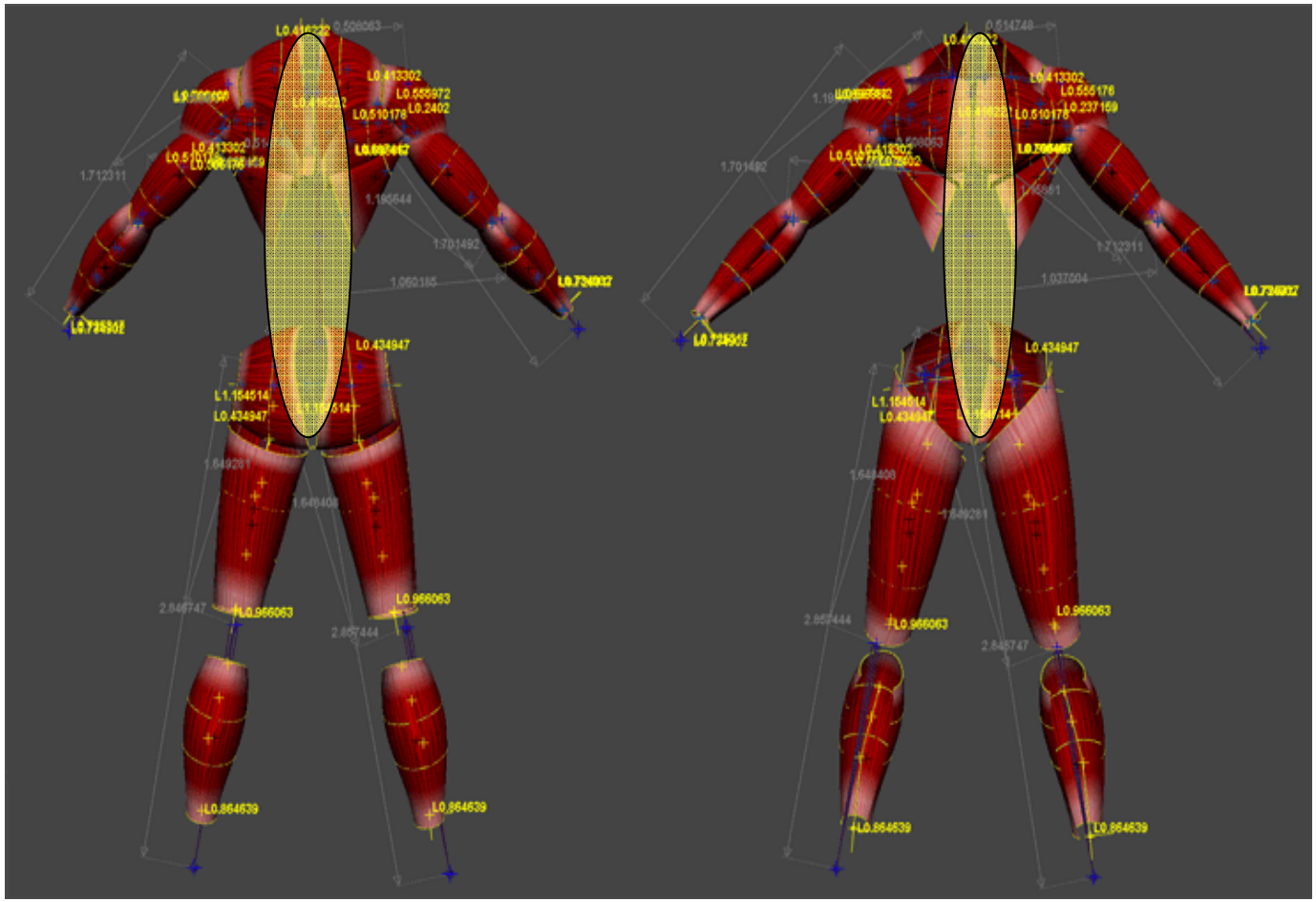
? PRAXES

- **According to many studies strength and coordination are basic abilities for successful playing of handball…**

DEVELOPMENT OF STRENGTH IN CHILDREN / Youth

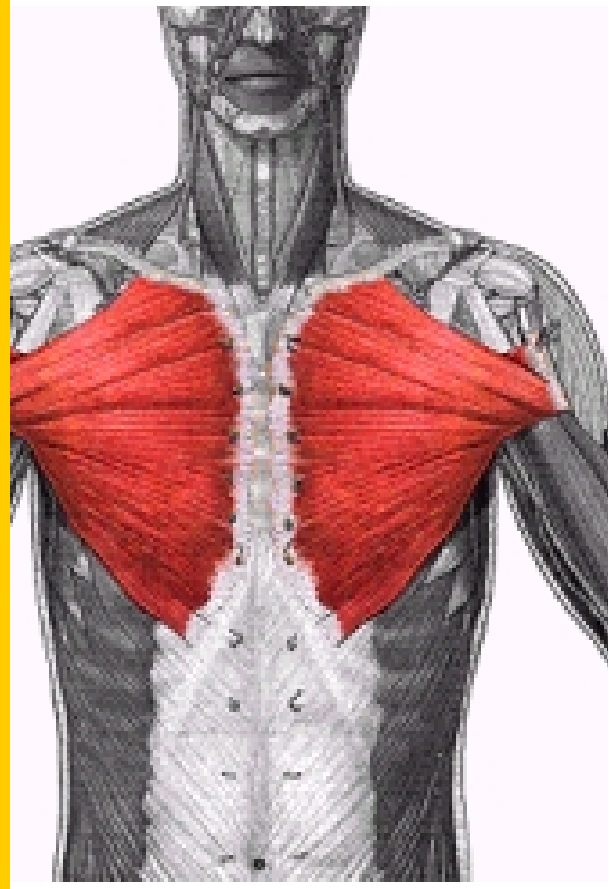
Main principles of strength training of a child/youth are (Šarabon, 2007

- muscle groups near the torso have to be strengthened first and only later those that are further away from the body.



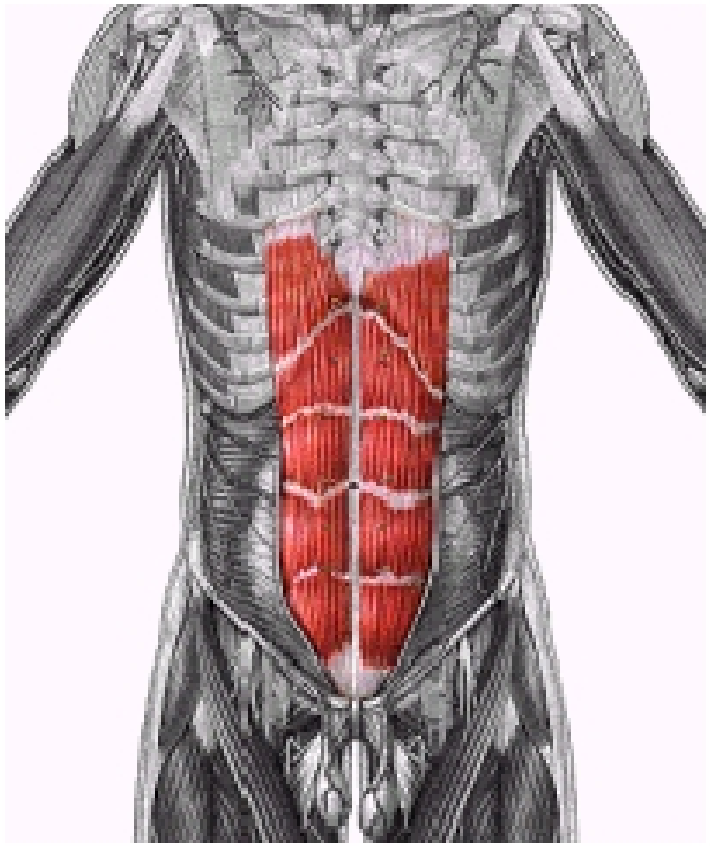
- Following muscle groups should be worked on: flexors, rotators and extensors of torso; muscles around shoulder blade and other muscles of shoulder girdle;.

MAJOR



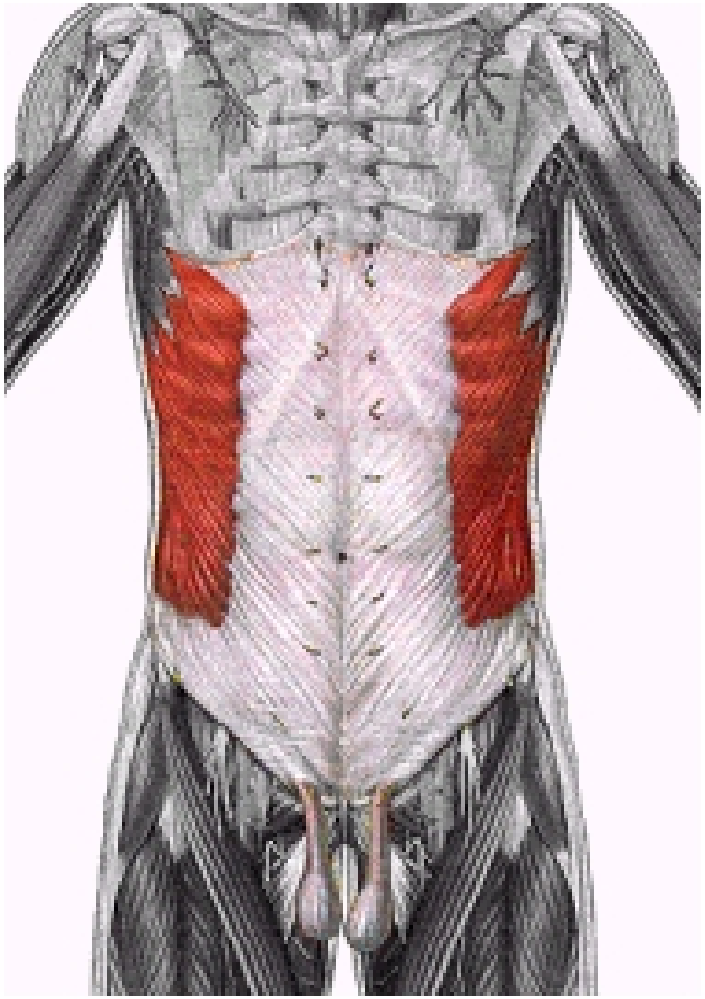
RECTUS ABDOMINIS

This is a medial superficial abdominal muscle extending from the pubis to the rib cage. Its origins are the pubic crest and pubic symphysis. It inserts on the xiphoid process and costal cartilages of the fifth through seventh ribs. It acts to flex the vertebral column (standing you bow, lying down you do a sit up). We use it to increase pressure on internal organs during defecation, urination and labor. It also helps to depress the rib cage during forced expiration.



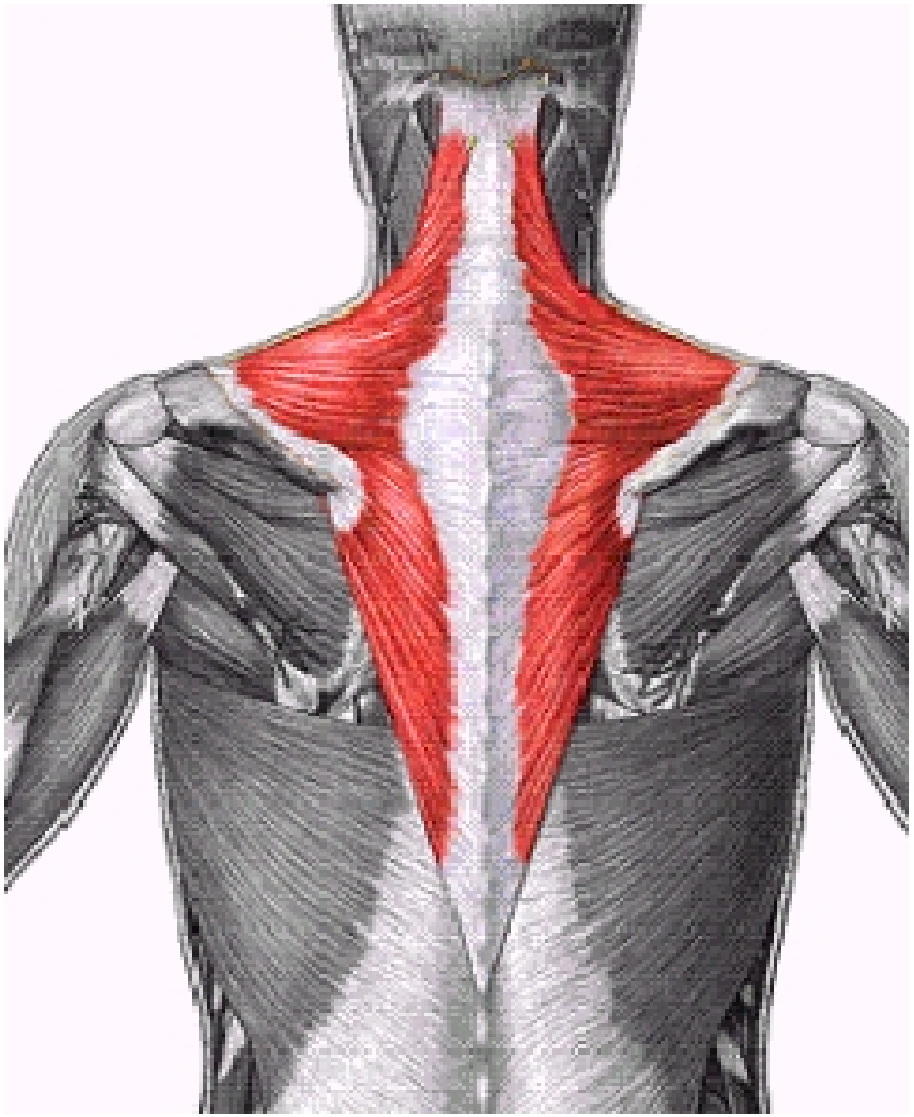
EXTERNAL ABDOMINAL OBLIQUE

A superficial, lateral muscle, its fibers run downward and medially. It extends from the last eight ribs (origins) to the linea alba, pubic tubercles and iliac crest. Has actions similar to the rectus abdominis. In addition, it is used for lateral flexion and trunk rotation.



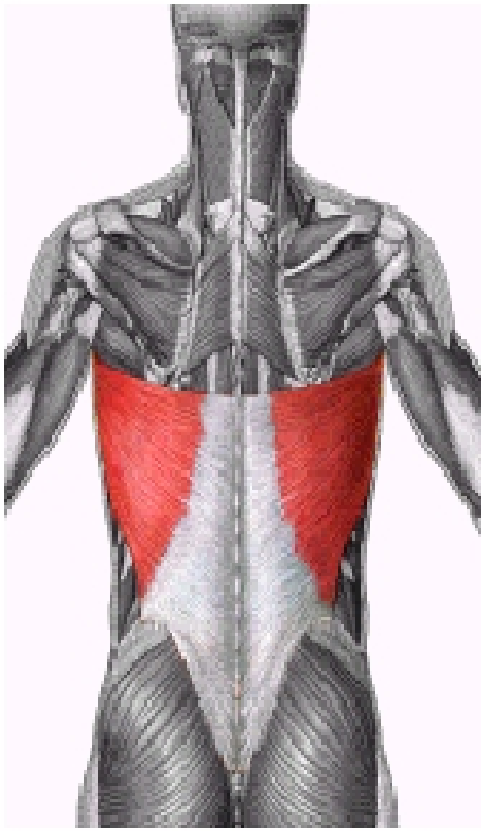
TRAPEZIUS

Posterior muscle of neck and most superficial muscle of the back. The trapezius has multiple origins on thoracic and lumbar vertebrae, the lower four ribs and the iliac crest. It inserts on the acromion and spinous processes of the scapula and the clavicle. Its actions include extension of the head, adduction and vertical movements of the scapulae.



LATISSIMUS DORSI

It is a broad, flat muscle of the lower back. It has multiple origins on the thoracic and lumbar vertebrae, lower ribs and iliac crest. It insert on the intertubercular groove of the humerus. The latissimus dorsi is the prime mover of arm extension. It adducts, medially rotates and brings the arm down as in the swimming stroke.



sub-maximal loads

- Mainly sub-maximal loads should be used and technical side of the exercises has to be emphasised (starting position, final position, movement).

Specific atention muscles around the knee

- The correct ratio of muscles around the knee joint is probably one of the key goals that every fitness programme should consider. Ignoring this often leads to unbalanced coordination of lower extremities and torso and to injuries in knee joint or one of the surrounding articulation systems.

Specific periodisation of strength training is not sensible.

- The principle of gradualism and regularity of training has to be adhered (same muscle group is loaded at least twice a week); according to the set goal the quantities for training of repetitive strength or light pliometry can be used.

exercises that include own body weight

- Depending on the training level and goals that are being pursued in all age period, use of exercises that include own body weight is being advised.

Differentiation

- Suitably designed and monitored strength training is safe for children (7- 12);

exercises that include own body weight

Differentiation

- As example we remember that from the 15 years of age, we can work with charge up to 60% of the corporal weight of the athletes.
- From the 17-18 years, we can will develop charge of gradual form until we will reach the maximum force if necessary it will be.

In the period prior to adolescence

- capacity for the increase of muscle mass in this period is very small.
- In this age body does not yet have biological foundations, which would allow the increase of muscle mass. This includes mainly endocrine system and hormone levels, which allow undisturbed anabolism of muscle fibres.

various exercises that include sliding and crawling

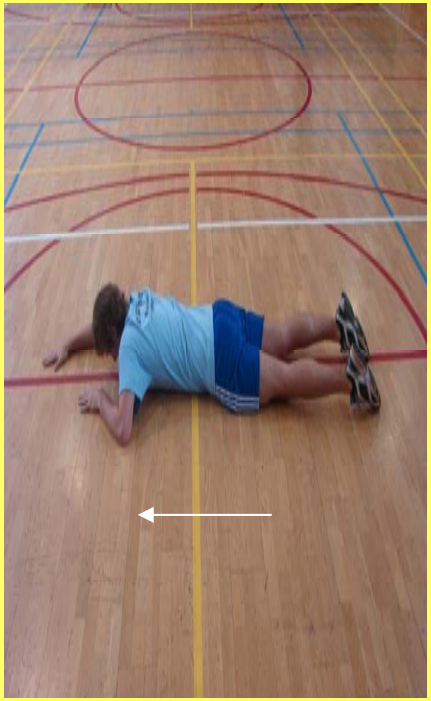
- are most suitable in the period of physical development.

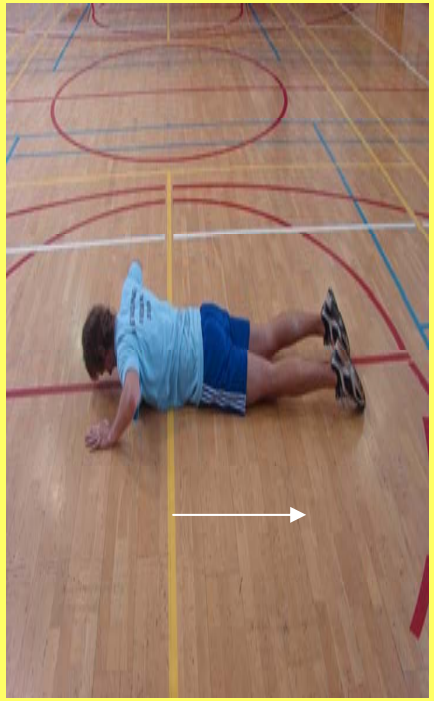
Improving Strength without loosing coordination

natural types of movement

SLIDING EXERCISES

Sliding exercises are movements with arms, legs and torso being used for moving of the body, whilst the body is in contact with surface





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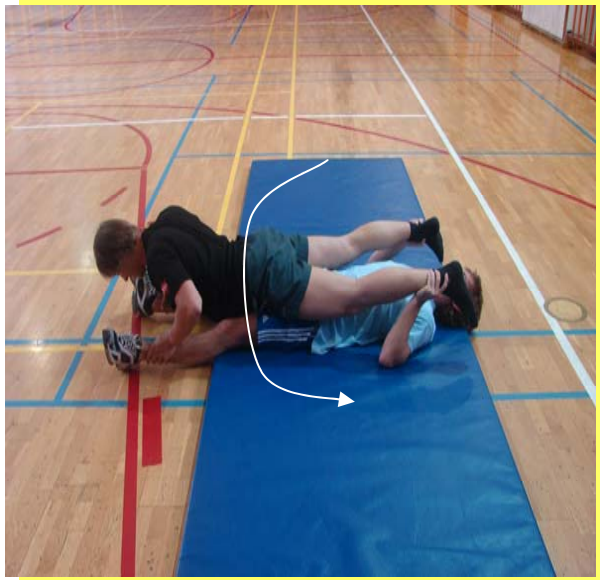
With partner (as a load for strengthening or help in execution of movement



Slika 7

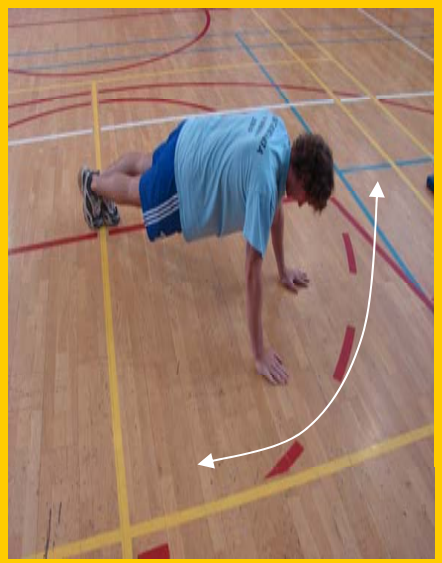
Slika 8

Crawling exercises

- Crawling exercises are movements on arms and legs whilst the torso is lifted away from the surface. These movements can be performed in various supports (lying, kneeling, crouching or seating).

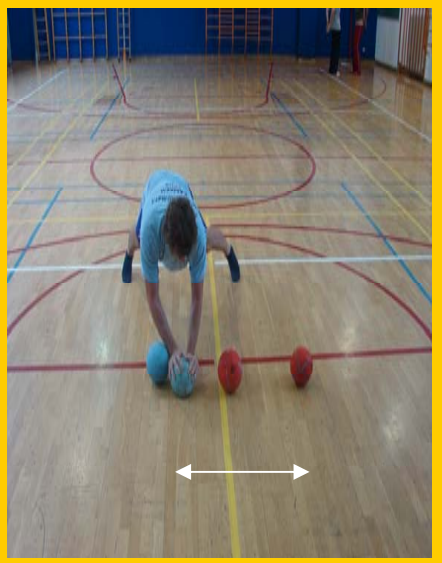
Slika 19

- *Crawling exercises in the front lying support (stomach facing downwards) on hands and feet:*



15a Slika 115a

15bSlika 15b



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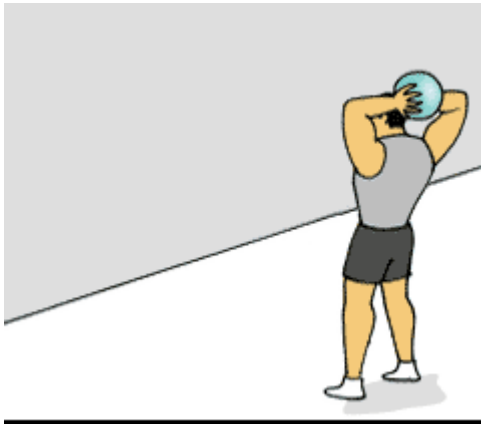
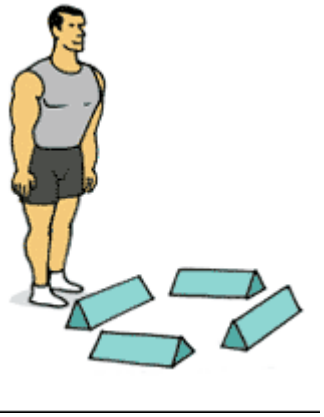
Marta Bon

Circle T





Ball Core Exercises!

Propriocptive training

Balance Training Kit

Marta Bon

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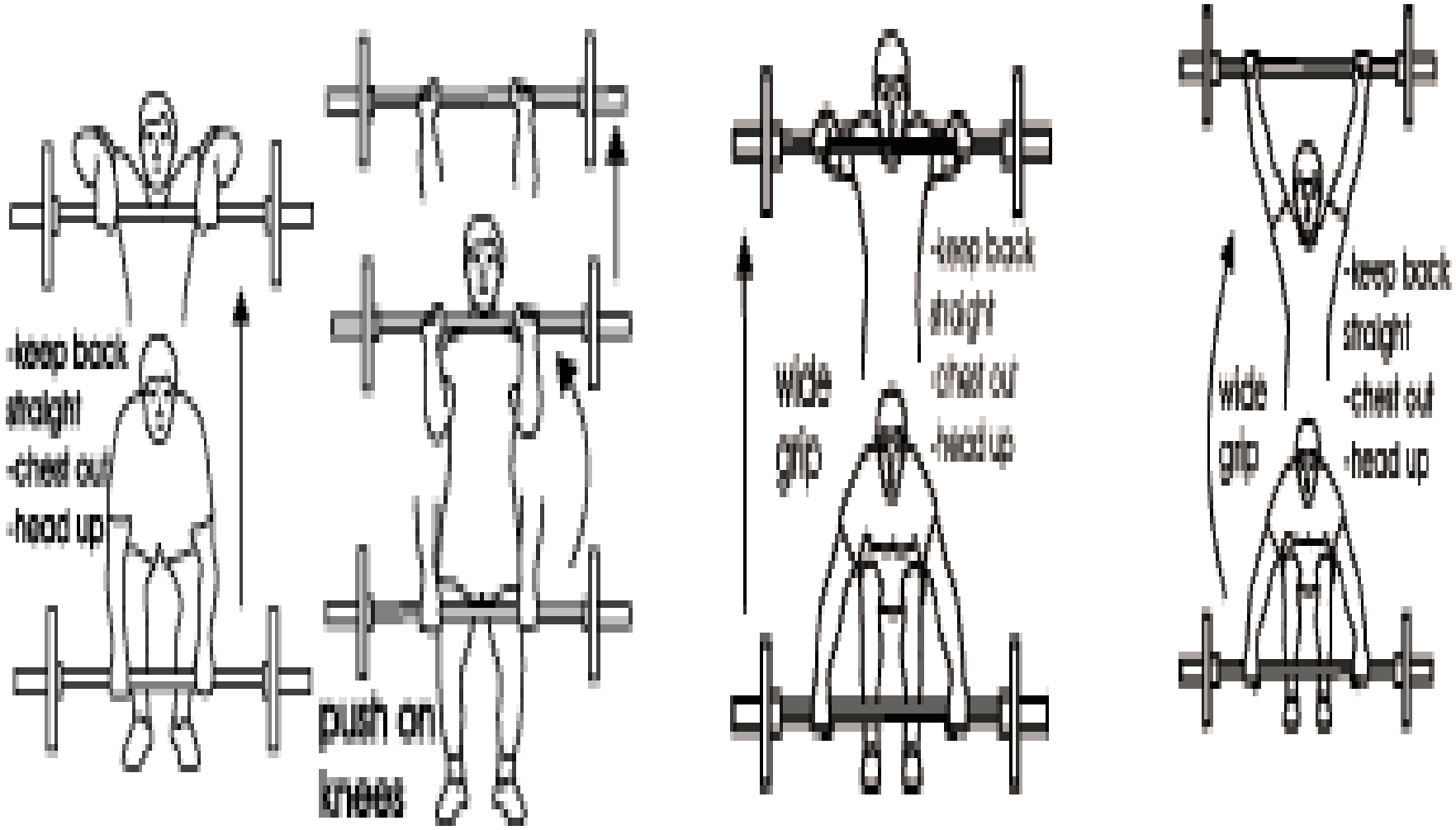
Marta Bon


CPK
Finor
2
HITACHI
Adidas

conclusion

Weightlifting



☺ carefully