REFLEXES

The stretch reflex

Physiological stretch reflex are present in a healthy individual.

The evocation of reflex: by tapping of neurological hammer on the respective tendon

The tapping: only one reasonably strong, painless, fast, accurate

The muscle groups, that are investigated: relaxed

The position and the grip: the best one position and one grip for the examination of all reflexes on the limb

Reinforcement maneuvers to improve the evoking:

- Placing the therapist's fingers on the tendon (stretching) and tapping on the fingers
- Jendrassik's maneuver - clinch the hands together and try to break away or the patient to clench their teeth or the isometric contraction on the opposite limb = on the basis of the phenomenon of irradiation
- A distraction: eg. calculation: from 100 gradually subtract 7
- Change positions: in lying supine the response is the lowest, in sitting or standing the excitability of the central nervous system increases and the responses are higher

Response:

Normoreflexia = the muscle contraction with an adequate motion

Hyperreflexia = increased response, muscle contraction with significantly large movement
= response even with slight tapping of hammer
= the reflex zone (area of inducing) is extended beyond the tendon
= in central paresis, in disorders of the extrapyramidal system, in cerebellar lesions with pendulum movements

Hyporeflexia = the decreased response (only contraction happens but not to move), necessary sharper tap and reinforcement maneuver

Areflexia = no response
= in peripheral paresis

	Rate the reflex with the following scale:
5+	Sustained clonus
4+	Very brisk, hyperreflexive, with clonus
3+	Brisker or more reflexive than normally.
2+	Normal
1+	Low normal, diminished
0.5+	A reflex that is only elicited with reinforcement
0	No response

Checking: the quality of response and a comparison of both sides

The upper extremities stretch reflexes

Finger flexor reflex (spinal segment C8)
The position: the forearm in supination, the fingers in semiflexion, therapist holds the patient's fingers from the the palmar side
The tapping: on the finger flexor tendons in the middle of the palm or on the therapist's fingers
The response: gentle flexion of finger, when the response is inadequate, it is possible fingers flexion against the resistance of the therapist's fingers

Pronator teres reflex (spinal segment C6-7)
The position: the elbow in semiflexion, the forearm in supination
The tapping: on the tendon m. pronator teres - on the process styloidus radii from the inside
Response: the forearm pronation

Brachioradialis reflex (spinal segment C6):
The position: the elbow in semiflexion, the forearm in middle position
The tapping: on the tendon m. brachioradialis on the distal radius
The response: dorsal flexion of the wrist
To enhance the response: therapist's finger on the lower end of the radius and tapping of the fingers

The phenomenon of the upper forearm
The position: the elbow in semiflexion, forearm in the middle position
The tapping: on the muscle belly of m. brachioradialis
The response: dorsal flexion of the wrist – physiological, elbow flexion – pathologic

Biceps reflex (spinal segments C4-5)
The position: elbow in semiflexion, the forearm in supination
The tapping: on the tendon m. biceps brachii
The response: flexion of the forearm
For the increased response: the therapist's thumb tendon on the tendon of the biceps – elongation, the tapping on the therapist's thumb

Triceps reflex (spinal segments C5-7)
The position: the arm in flexion, forearm is bent toward the opposite shoulder, therapist fixates the arm
The tapping: on the tendon m. triceps brachii just above the olecranon
The response: extension of the forearm

The lower extremities stretch reflexes

Patellar tendon reflex (spinal segment L2-4):

The position: supine – lower limb should be flexed in all joints, but also semiflexion with underlay knee is good

The tapping: on the ligamentum patellae, between the patella and the tendon on the tibia

The response: extension in the knee

Medial hamstring reflex (sinal segment L5)

The position: semiflexion v exteranal rotation in the hip joint

The tapping: on the tendon of medial hamstrings (m. semitendinosus, m. semimembranosus)

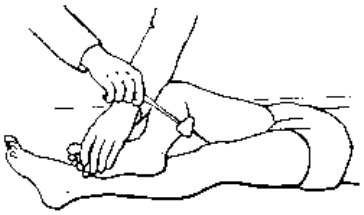
The response: flexion in the knee

For reinforcement: tapping on the therapist's fingers

Achilles tendon reflex (spinal segment L5-S2):

The position: supine flexion in all joints, foot passively put into the middle position – the best in dorsal flexion ; prone lying, kneeling – the feet over the edge of bed

Modified position:



The tapping: on the Achilles tendon

The response: plantar flexion

Medioplantar reflex

The position: supine flexion in all joints, foot passively put into the middle position – the best in dorsal flexion ; prone lying, kneeling – the feet over the edge of bed

The tapping: in the middle of the foot

The response: plantar flexion

Signs in damage upper motor neuron – the cortispinal pathways

Juster sign

The evoking: rubbing with a blunt instrument on the lateral side of the palm from the wrist to the metacarpal pads

The response: adduction and opposition of the thumb

Trömmer sign

The evoking: therapist grasps the 3rd finger from lateral sides and flincks into the 3rd fingertip

The response: flexion of the thumb or all fingers

Hoffmann sign

The evoking: therapist grasps the wrist and flincks through the 3rd nail

The response: flexion of the thumb or all fingers

Babinski sign

The evoking: rubbing with a blunt instrument on the lateral side of the foot from the heel to the metatarsal pads

The response: flexor: the toes curve down and inwards, and the foot everts; this is the response seen in healthy adults.

indifferent: there is no response.

extensor: the hallux dorsiflexes, and the other toes fan out; this is Babinski's sign, which indicates damage to the central nervous system.

Brissaud phenomena

The evoking: like Babinski sign

The response: clonus m. tensor fasciae latae

Chaddock sign

The evoking: around the lateral malleolus

The response: extension of the big toe

Oppenheim sign

The evoking: applying pressure along the medial side of the tibia

The response: dorsal flexion in ankle joint

Strümpel sign

The evoking: flexion in the hip and knee against the large resistence

The response: dorsal flexion of thumb and in ankle joint

Medel-Bechterev sign
The evoking: percussion on the os cuboideum on the dorsum of the foot
The response: flexion of the toes

Rossolimo sign
The evoking: percussion on the tips of the toes
The response: flexion of the toes

Žukovski – Kornilov sign
The evoking: percussion in the middle of the foot
The response: flexion of the toes

Reeducation of movement on the basis of inducing reflexes

Using: patient does not move with the limb or the part thereof and the reflex in this region can be induced

Methodical procedure

- I tell and show patient what I want him to do
- Stimulation of the skin exteroceptors above the working muscle groups: rubbing, scratching, pinching
- Stimulation of the muscle sprindle with rapid passive movement
- Voice stimulation: I tell patient “Do flextion, extension…”
- The evoking of reflex or sign
- Performance of the movement: passive, active with help, active