

# **MOTOR (PYRAMIDAL) SYSTEM**

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# **MOVEMENT -**

**one of the main  
manifestations of the living  
being**

● deglutition

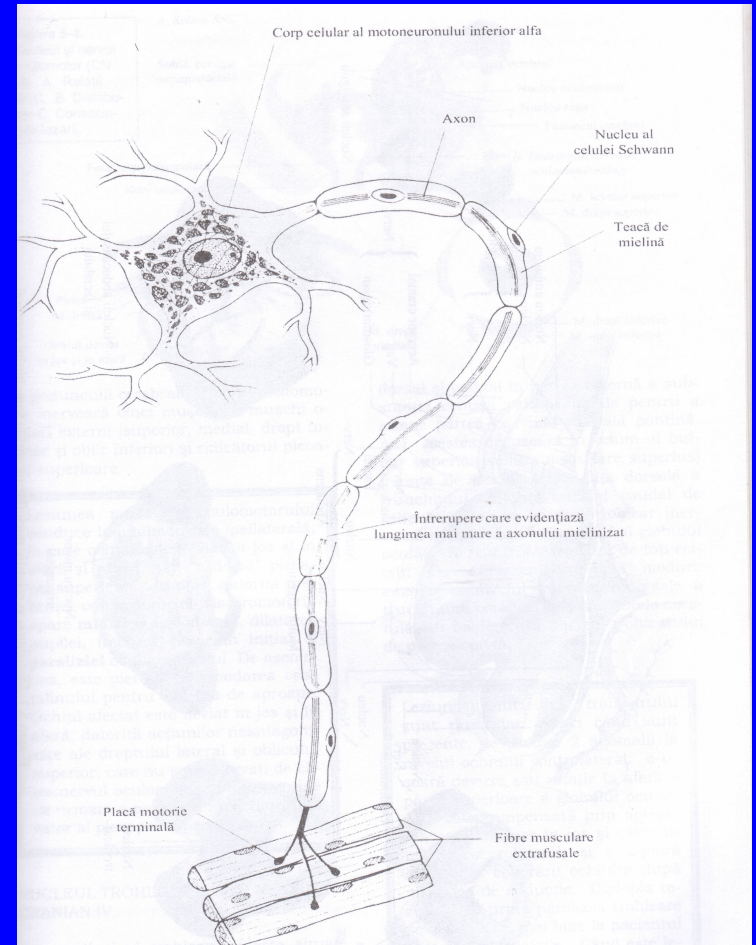
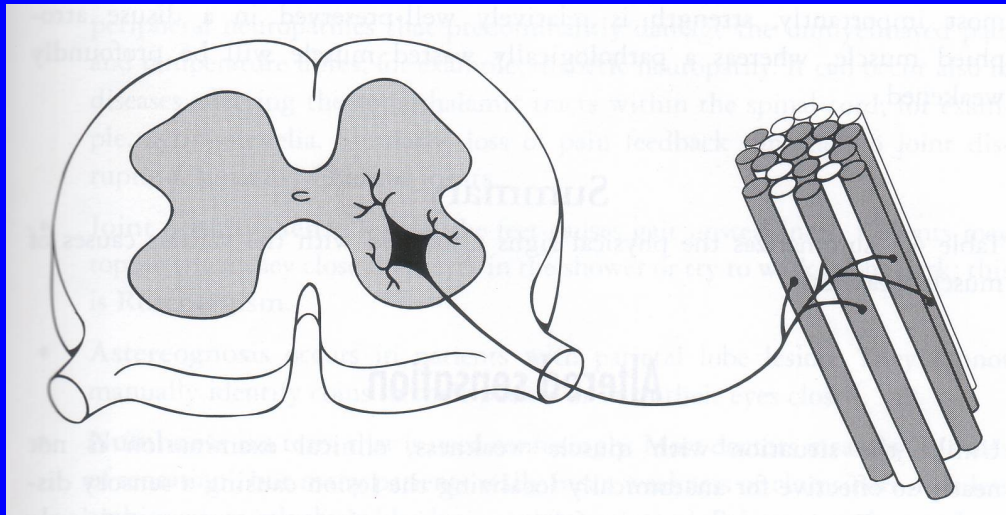
● breathing

● blood flow

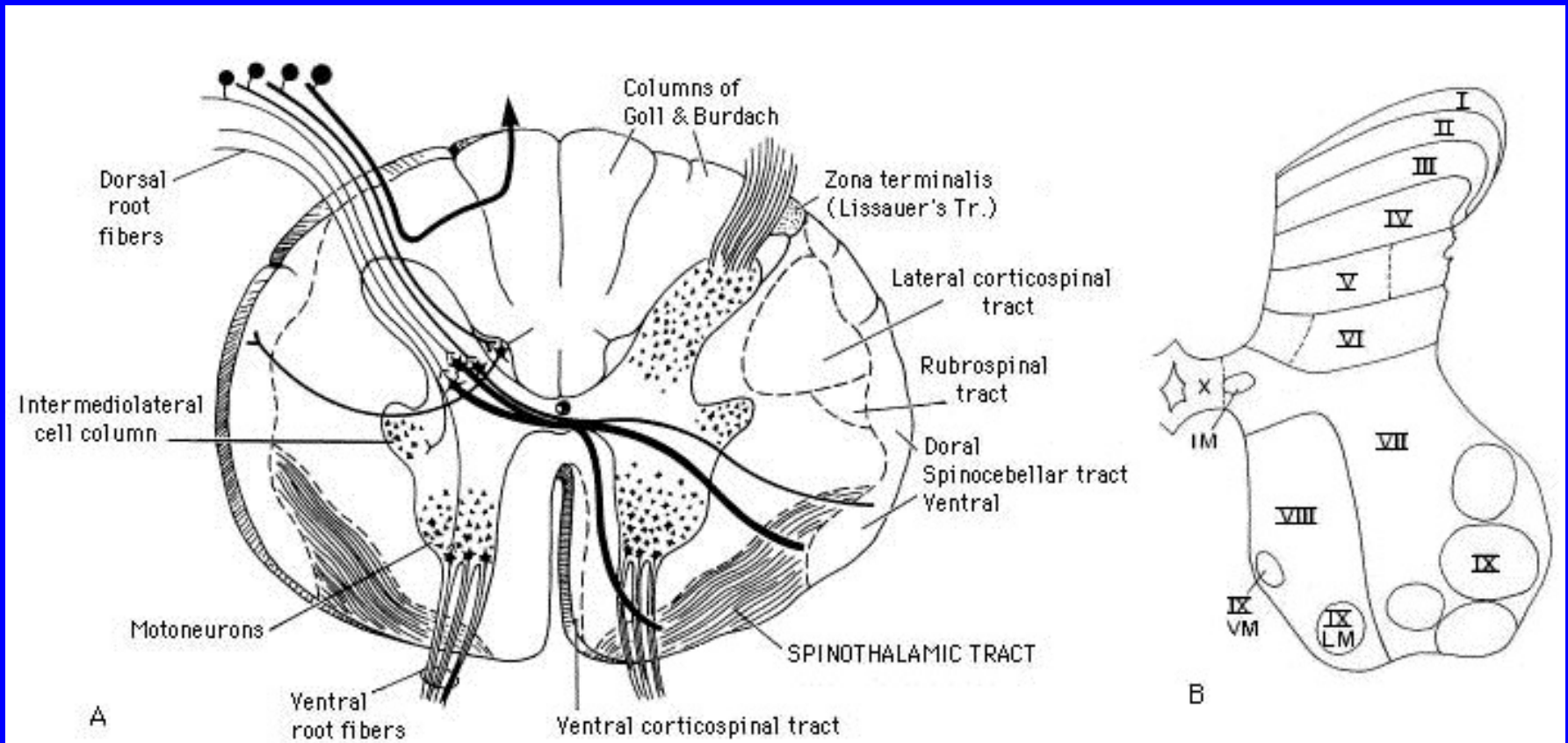
● moving in space

# The lower motor neuron

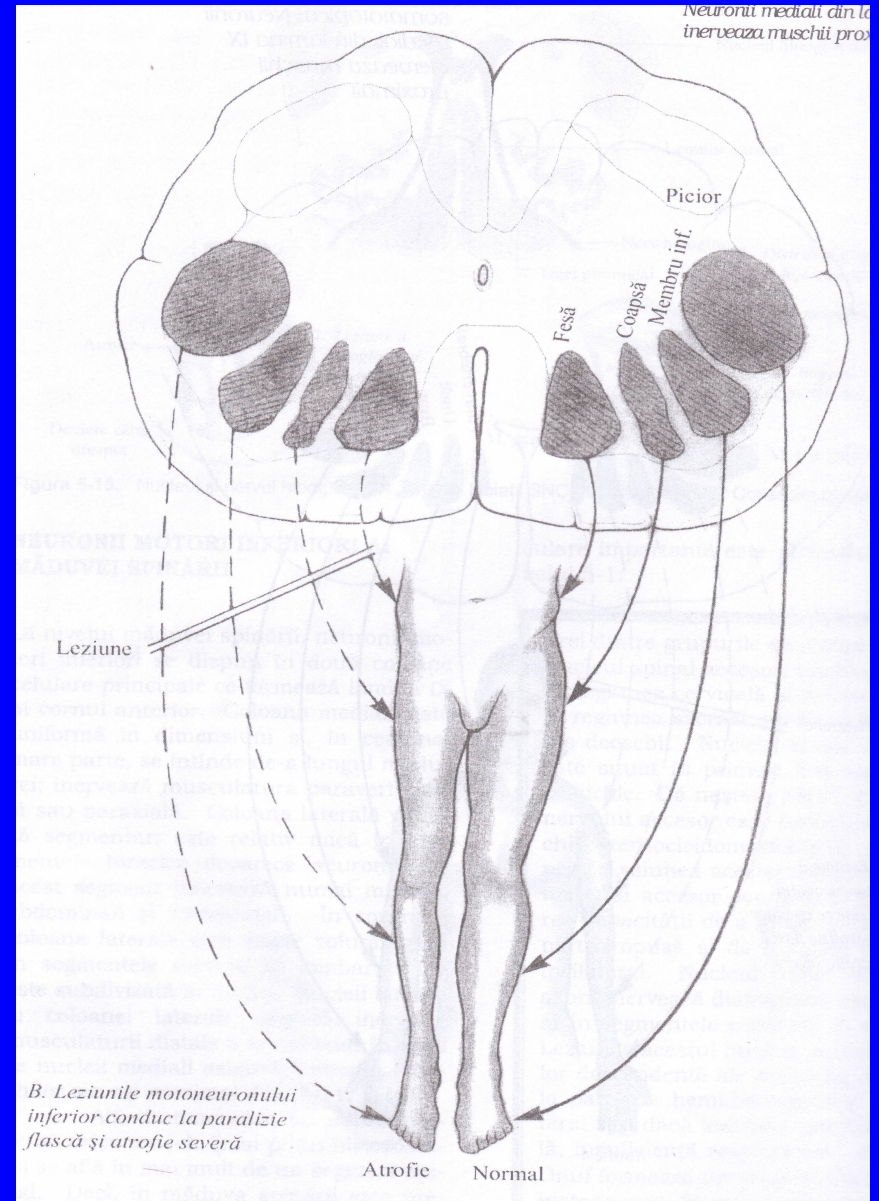
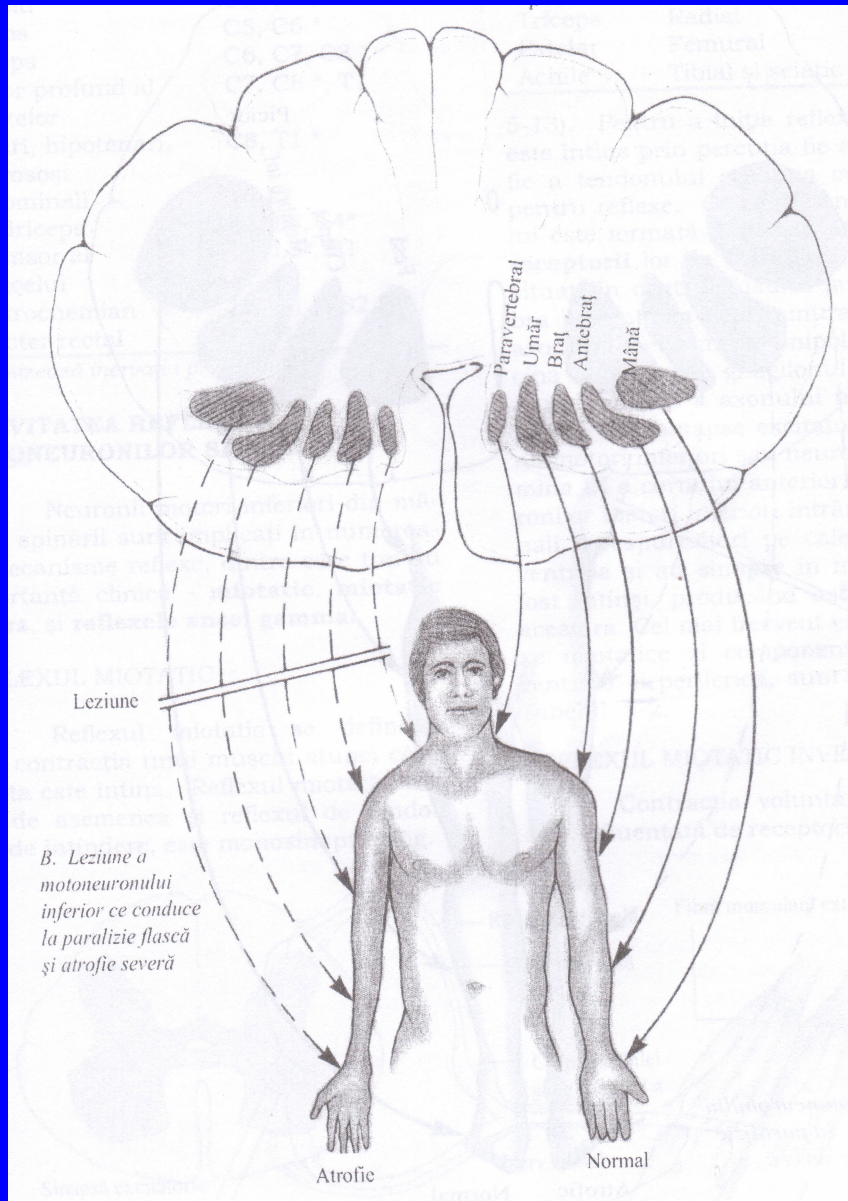
The motor unit:  
muscle fibers  
innervated by a  
single motor  
neurone.



# The lower motor neuron



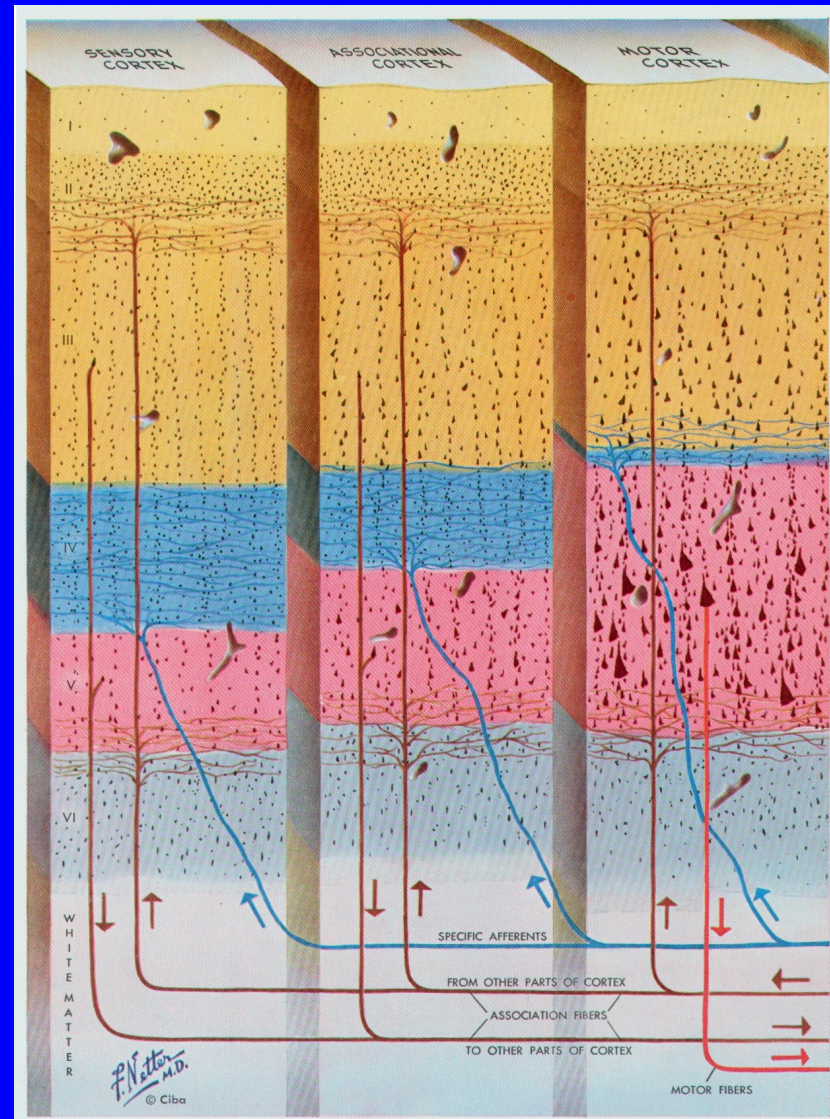
# The lower motor neuron



# The upper motor neurons

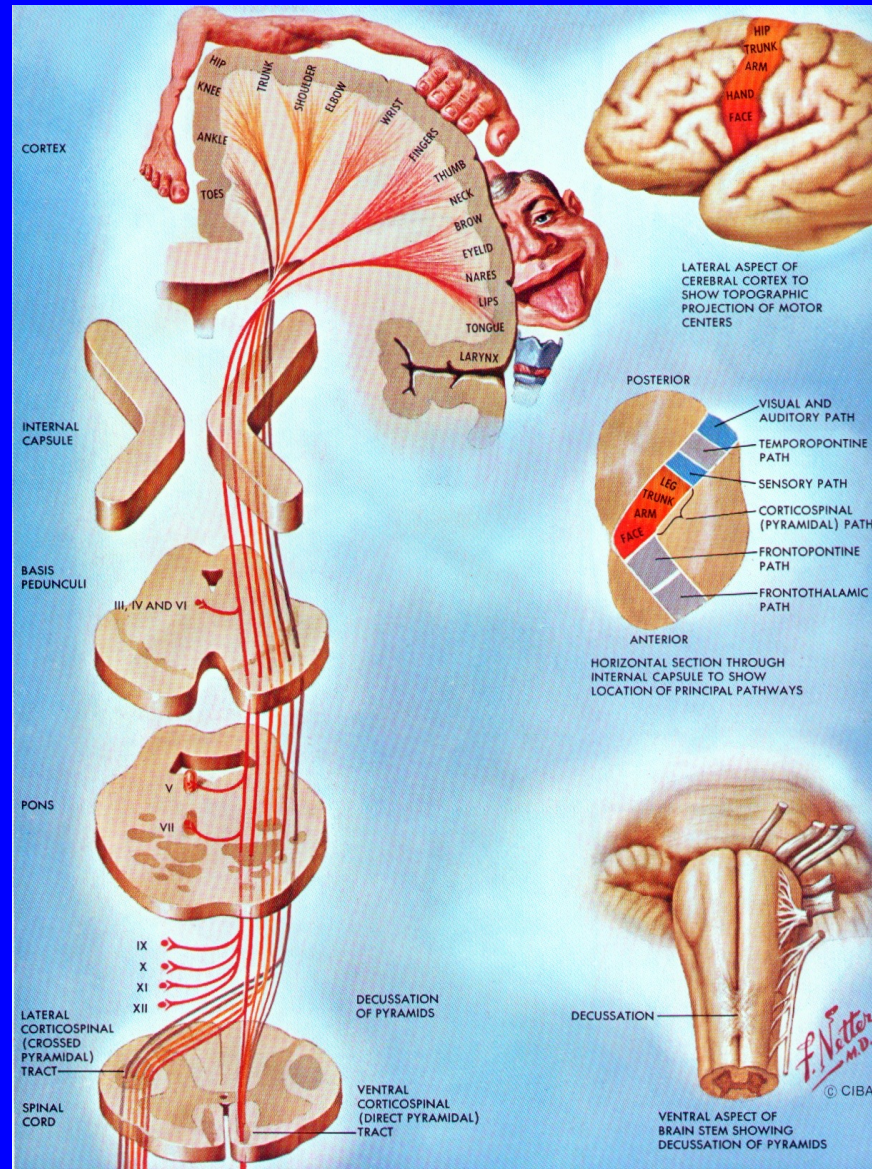
CEREBRAL CORTEX

Structure



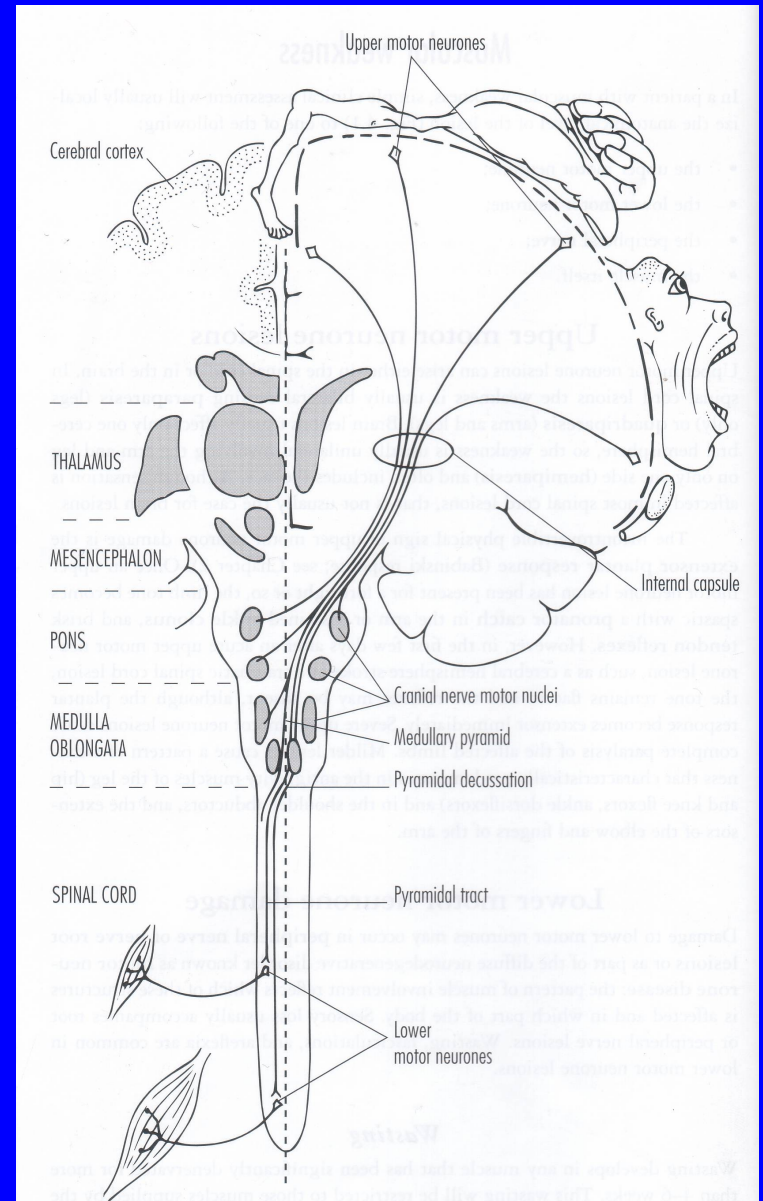
# The upper motor neurons

## Pyramidal System



# The upper motor neurons

Corticospinal Tract  
and  
Corticobulbar Tract





# MOTOR PARALYSIS

## Definitions

**Paralysis** derived from Greek words *para*, “beside, of, amiss”, and *lysis*, a “loosening” or “breaking up”:  
complete loss of motor function due to interruption of one of the motor pathways at any point from the cerebrum to the muscle fibers.

synonyms →

**Plegia** comes from a Greek word meaning “to strike”  
**Palsy** (old French word)

**Paresis** – slight loss of motor function.

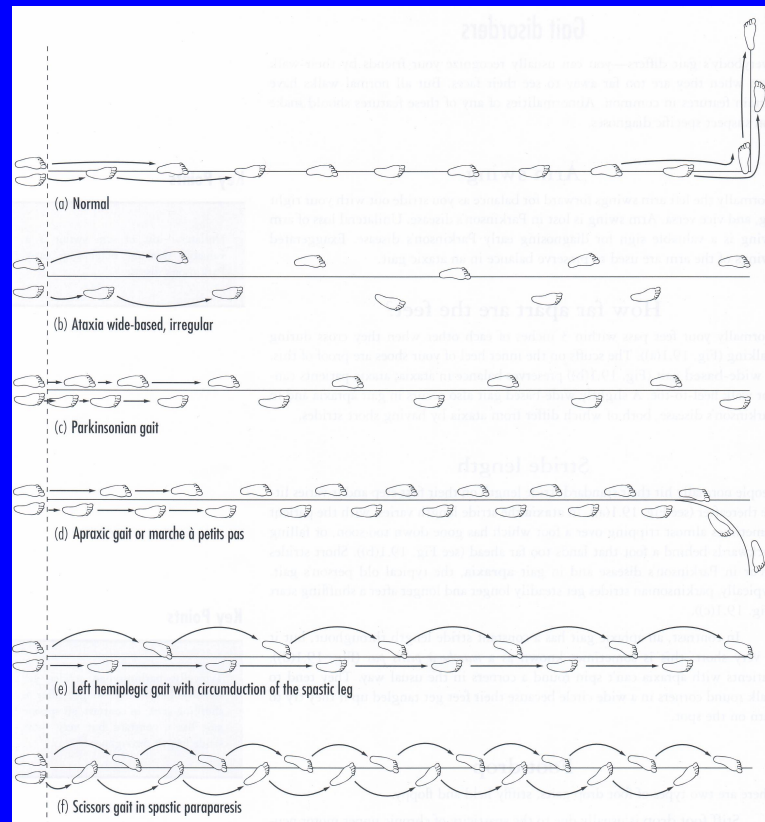
# EXAMINATION OF VOLUNTARY MOTILITY

## **I. GAIT:**

Normal ( healthy)      Paretic gait      Walking with help

Walking is not possible (wheelchair, stretcher)

footprint:



# EXAMINATION OF VOLUNTARY MOTILITY

## *II. Static examination of particular attitudes :*

Left radial nerv palsy



# EXAMINATION OF VOLUNTARY MOTILITY

## *II. Static examination of particular attitudes :*

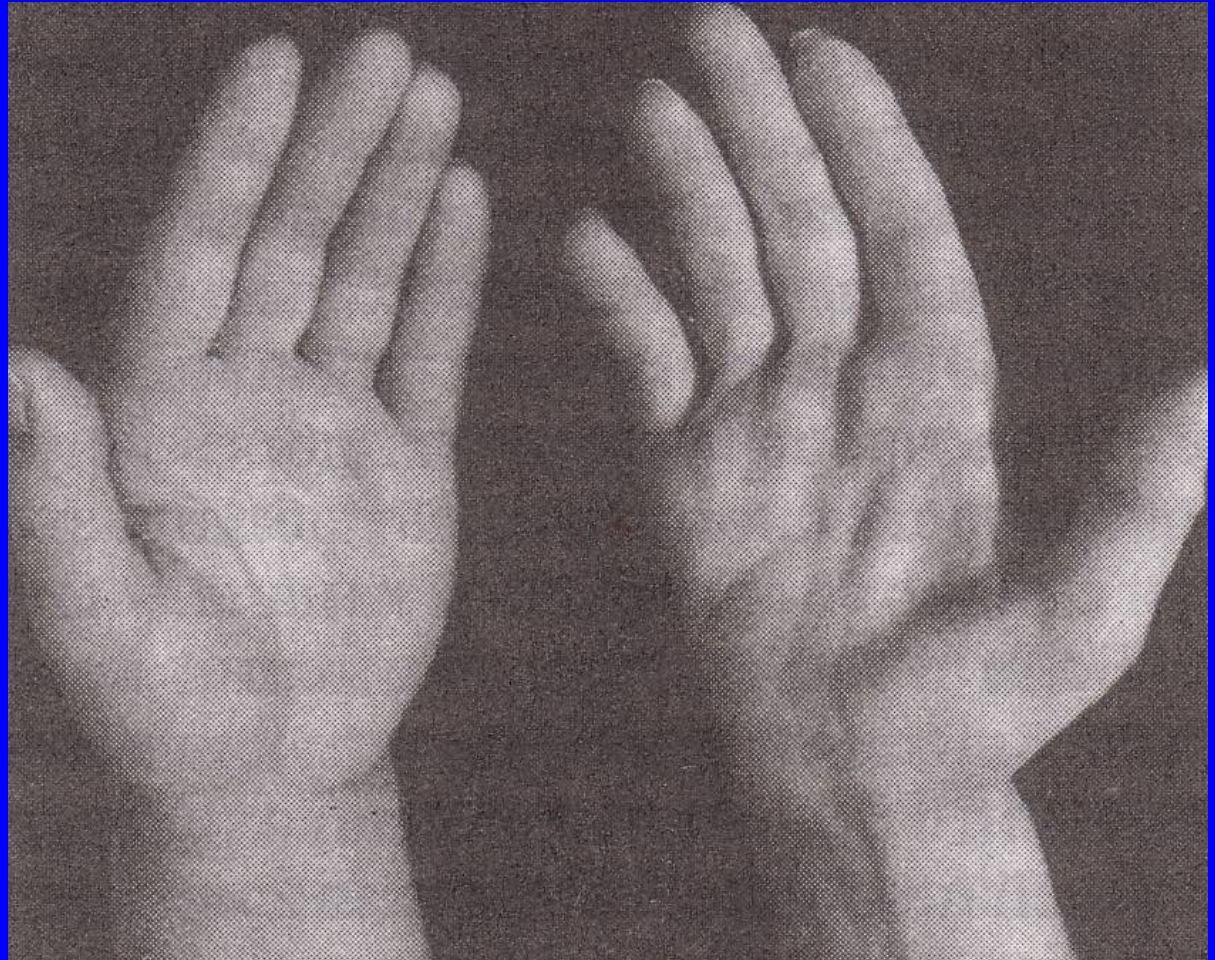
Right ulnar nerv  
palsy.



# EXAMINATION OF VOLUNTARY MOTILITY

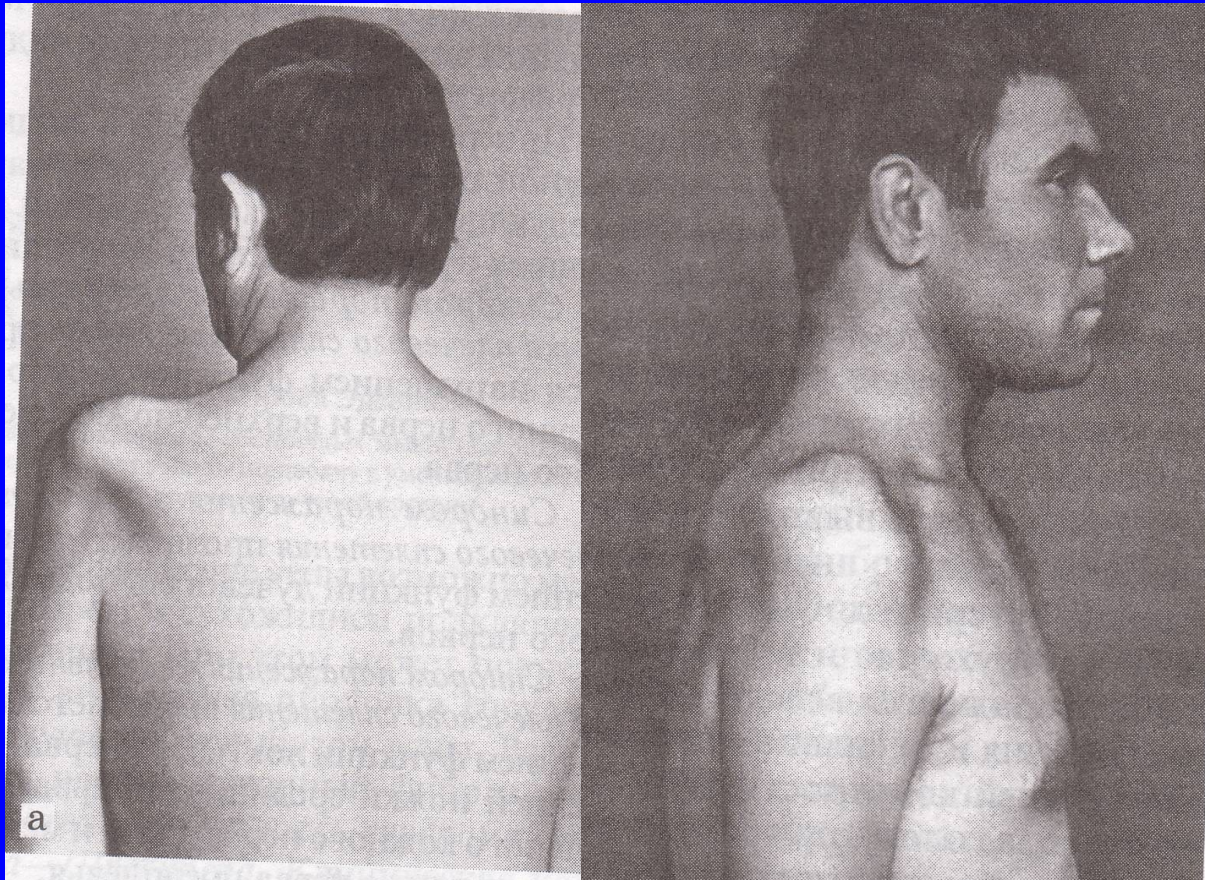
## *II. Static examination of particular attitudes :*

Right median  
nerv palsy.



# EXAMINATION OF VOLUNTARY MOTILITY

## *II. Static examination of particular attitudes :*

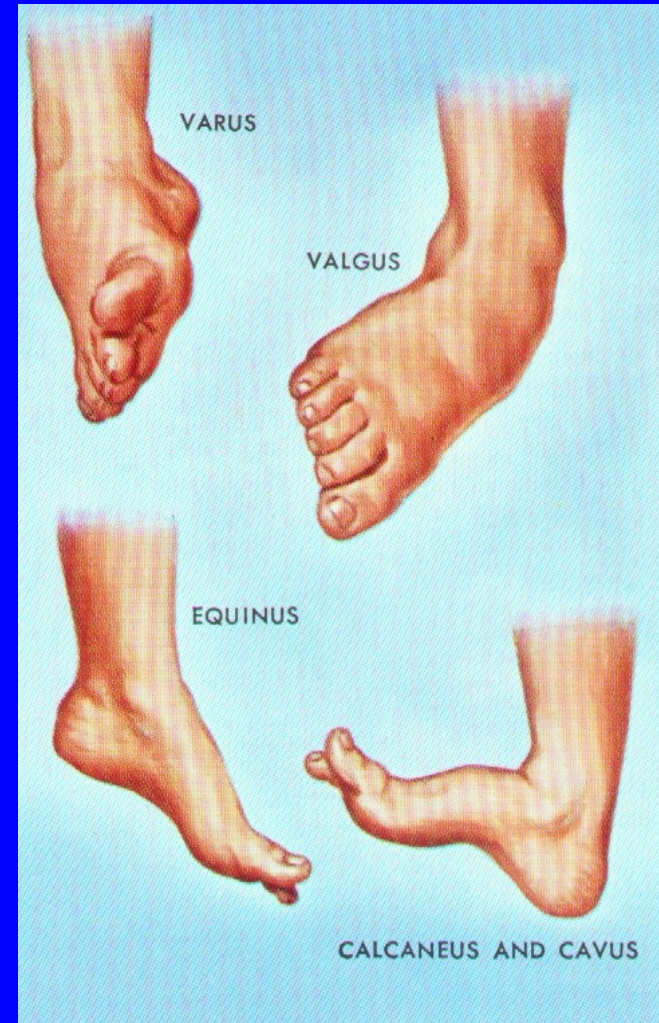


**Circumflex nerv  
palsy.**

# EXAMINATION OF VOLUNTARY MOTILITY

## *II. Static examination of particular attitudes :*

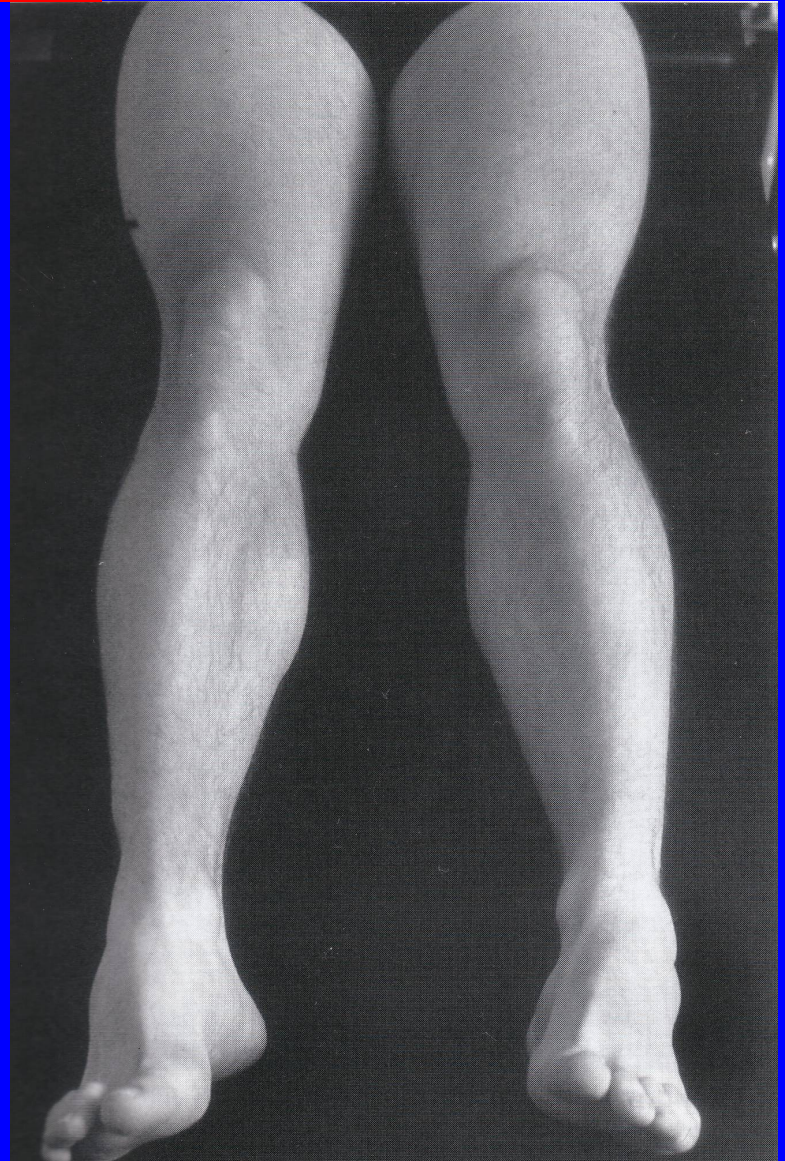
**Var-equina**



# EXAMINATION OF VOLUNTARY MOTILITY

## ***III. Static examination of the muscle relief:***

**Normal muscle relief**





# EXAMINATION OF VOLUNTARY MOTILITY

***III. Static  
examination of the  
muscle relief:***

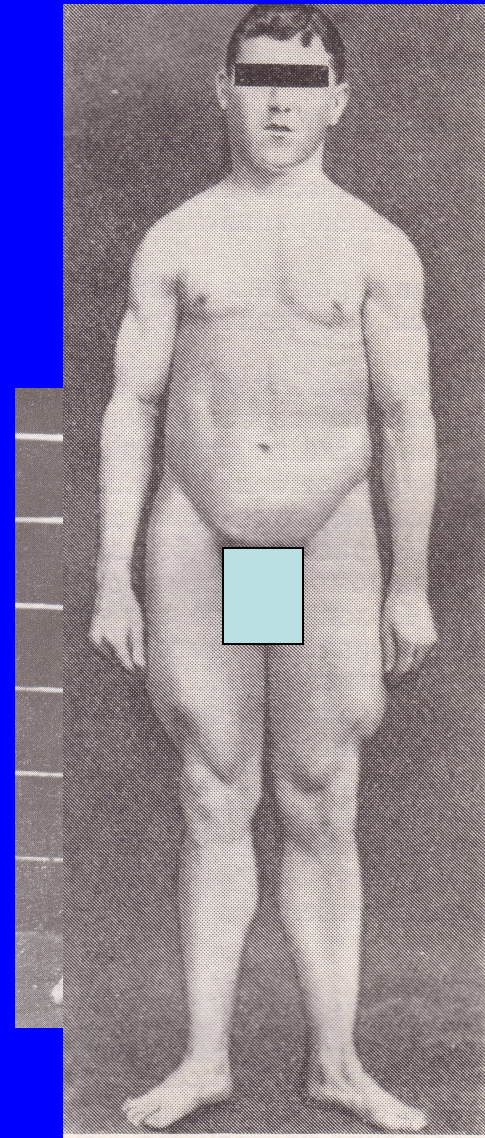
**Muscular hypotrophy**



# EXAMINATION OF VOLUNTARY MOTILITY

## ***IV. Static examination of the muscle relief:***

**Pseudohypertrophy in  
progressive muscular  
dystrophy Duchenne,  
Becker; myotonia Thomsen ).**



# EXAMINATION OF VOLUNTARY MOTILITY

## ***V. Static examination for pathological fasciculations.***

Fasciculations are contractions of some muscle fascicles, which do not lead to movements of the limb segments.

Pathological fasciculations don't stop after the rest and during the sleep.

# EXAMINATION OF VOLUNTARY MOTILITY

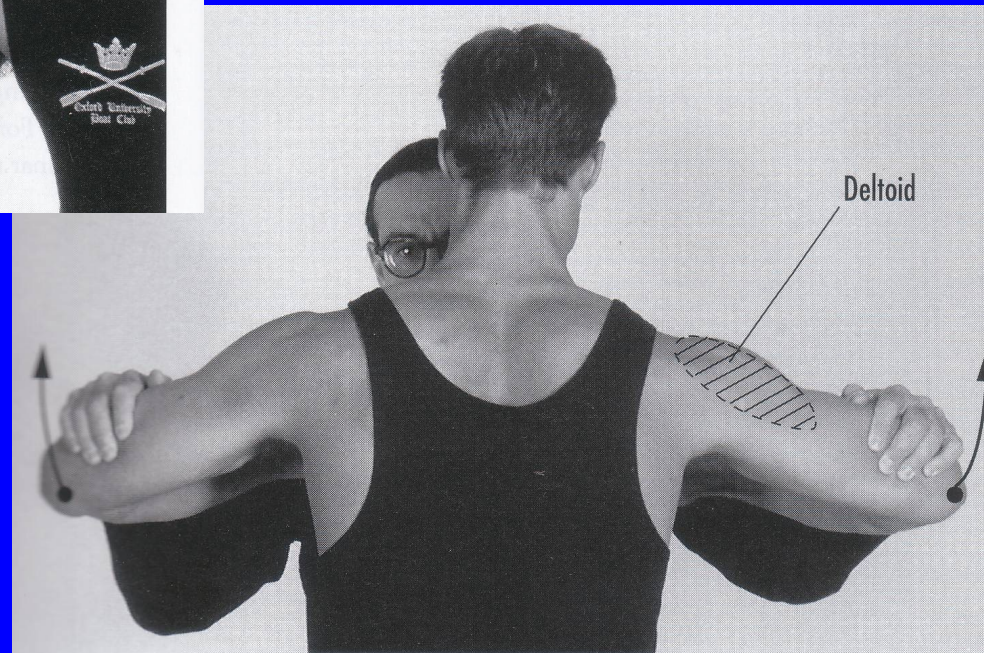
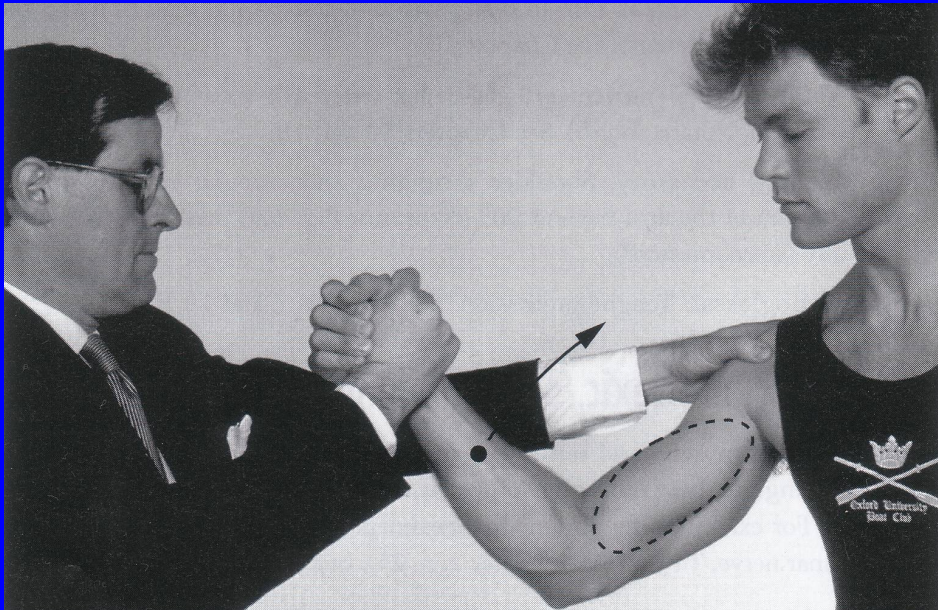
## *VI. Examination of muscle tone*

It is done by passive movements in all joints of the patient, in all possible directions; the patient is invited to keep the examined limbs as relaxed as possible.

1. NORMAL
2. HYPOTONUS
3. HYPERTONUS

# EXAMINATION OF VOLUNTARY MOTILITY

## *VI. Examination of the muscle power*



## ***Test muscle groups in a systematic way for power.***

Power when tested is graded conventionally using the Medical Research Council scale (MRC). This is usually amended to divide grade 4 into 4+, 4 and 4-, as below:

5 = normal power

4+ = submaximal movement against resistance

4 = moderate movement against resistance

4- = slight movement against resistance

3 = moves against gravity but not resistance

2 = moves with gravity eliminated

1 = flicker

0 = no movement

Power should be graded according to the maximum power attained, no matter how briefly this is maintained.

# EXAMINATION OF VOLUNTARY MOTILITY

## *VI. Special tests for discrete motor deficits*

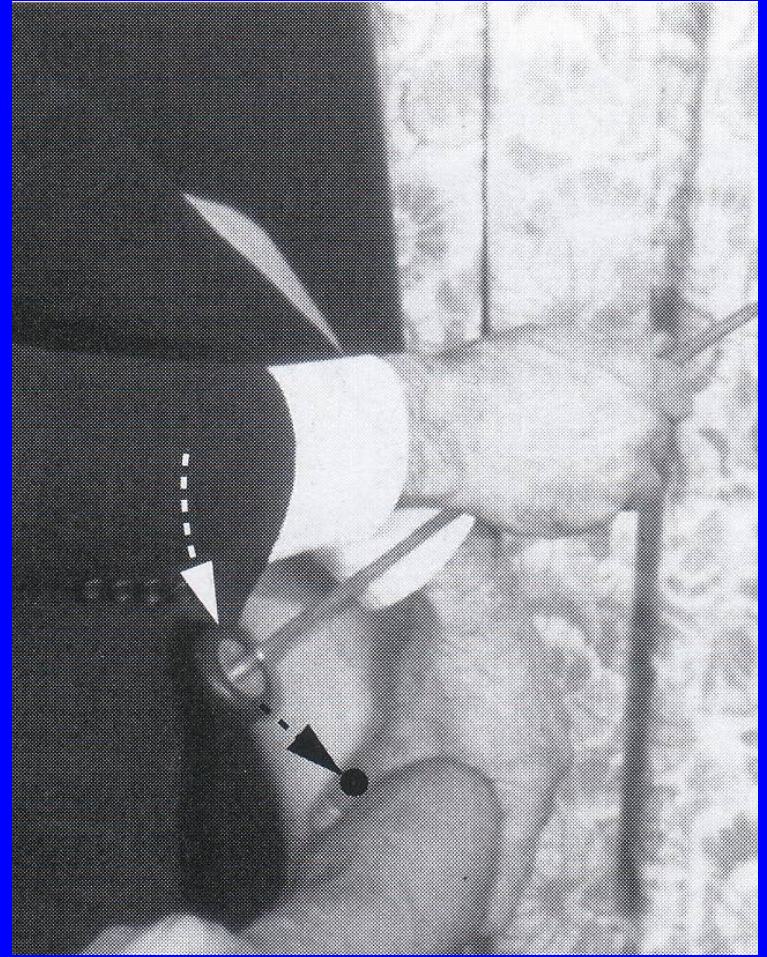
### 1. Barré:

- superior;
- inferior.

### 2. Mingazzini:

- superior;
- inferior.

# EXAMINATION OF VOLUNTARY MOTILITY



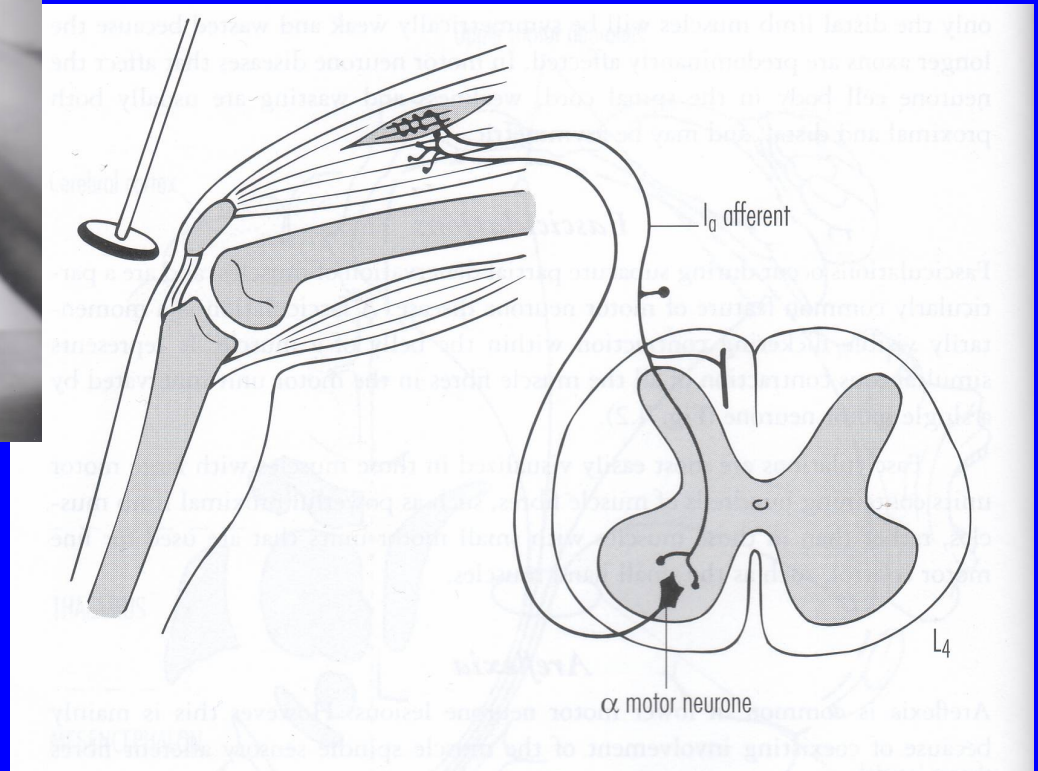
## VII. REFLEXES



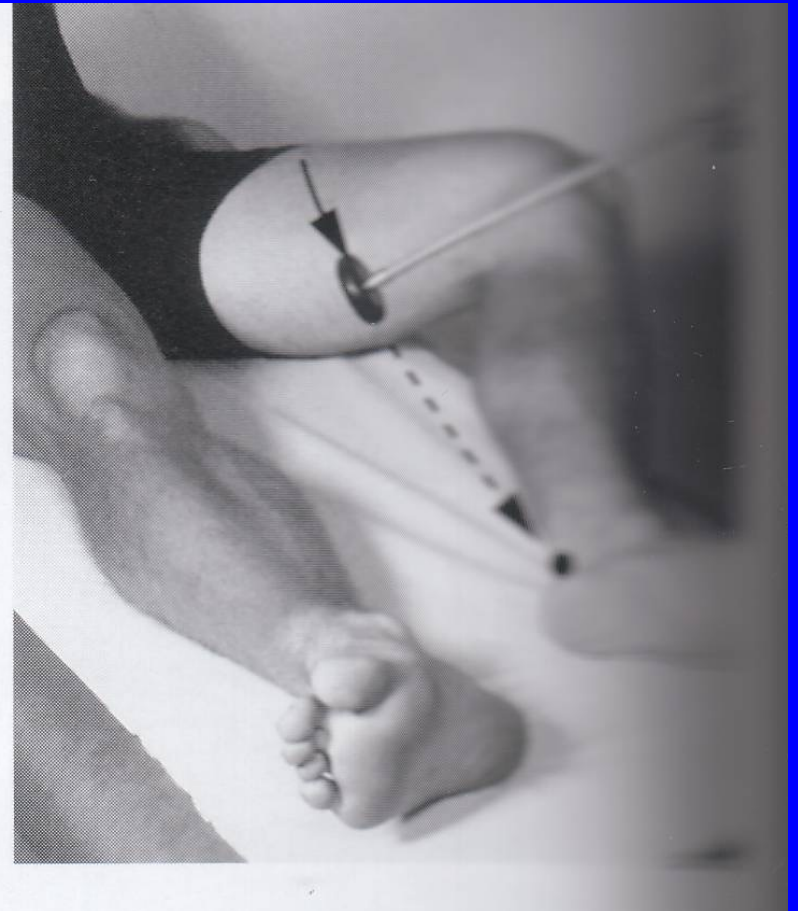
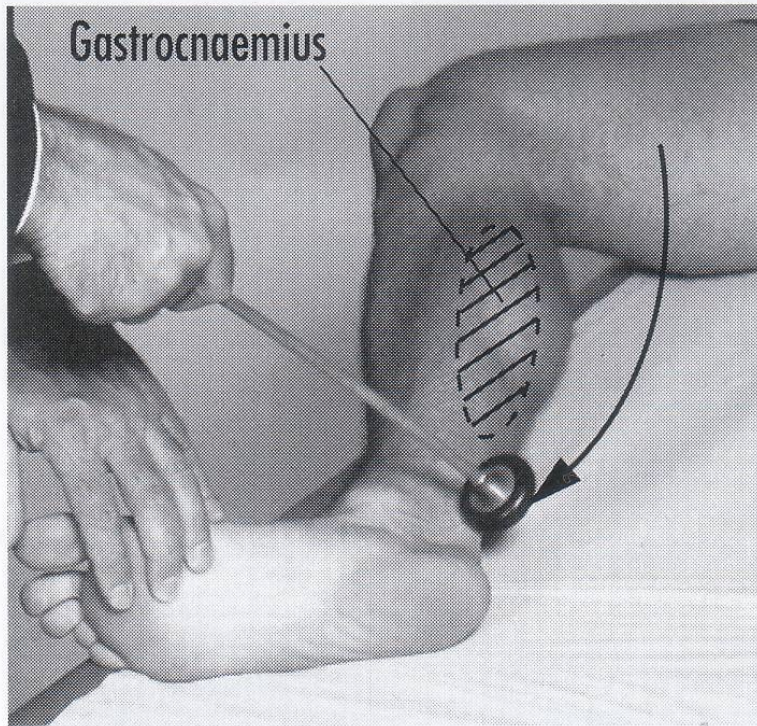
# REFLEXES



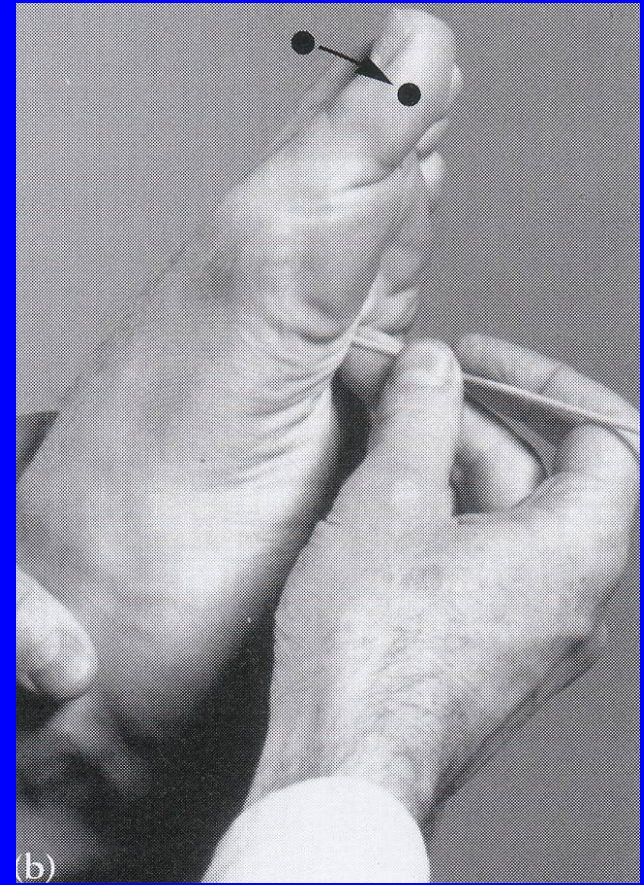
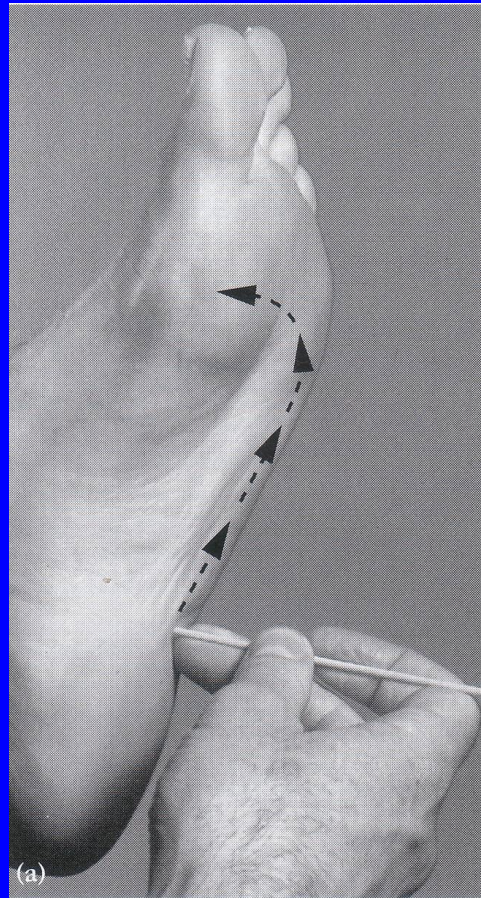
# REFLEXES



# REFLEXES



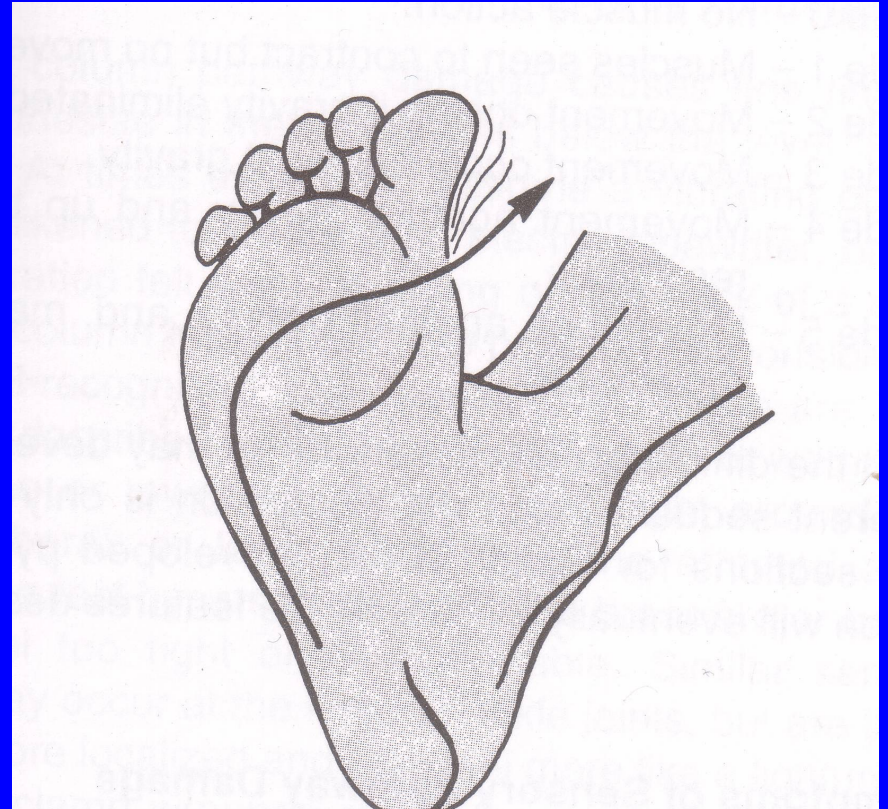
# REFLEXES



# EXAMINATION OF VOLUNTARY MOTILITY

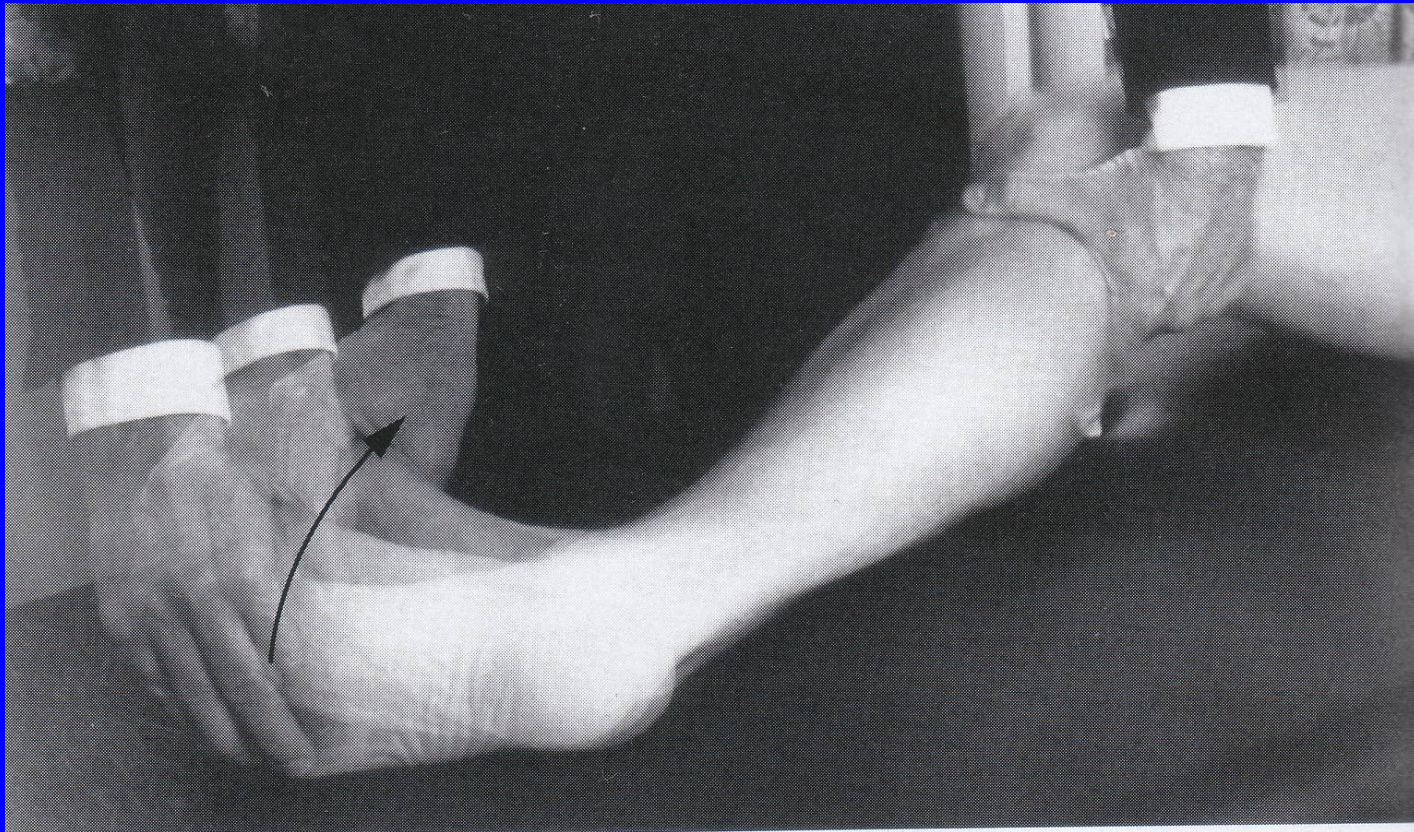
## *VIII. Pathological reflexes and clonus*

### BABINSKI SIGN



# EXAMINATION OF VOLUNTARY MOTILITY

## *VIII. Pathological reflexes and clonus*



CLONUS

# Paralysis Due to Lesions of the Lower Motor Neurons

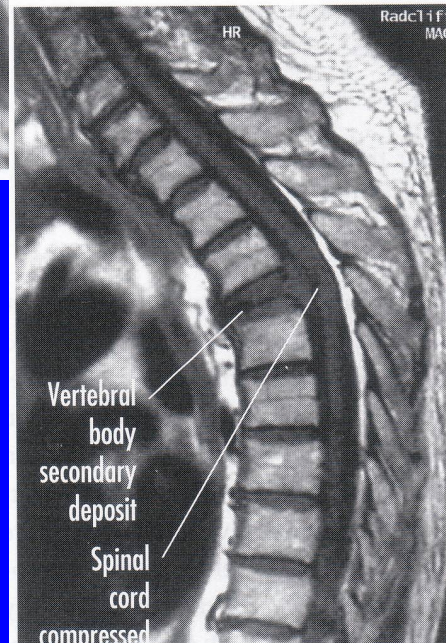
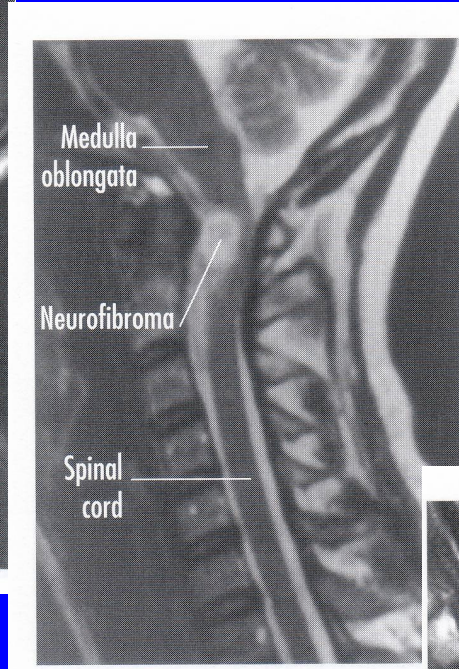
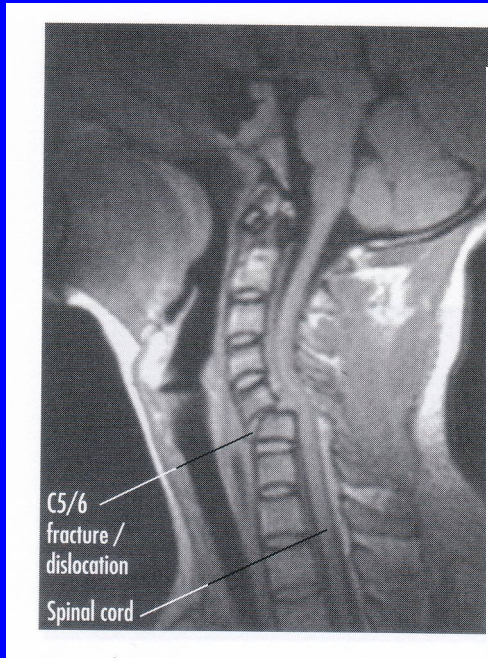
*Muscle Hypo- or Atrophy.*

*Fasciculations.* The electrodiagnosis find fibrillations, fasciculations, and other abnormalities on needle electrode examination.

*Test for tone.* Flaccidity (*hypotonia* or *atonia*)

*Reduced or absent reflexes*

# DISEASES with LOWER MOTOR NEURON SYNDROME





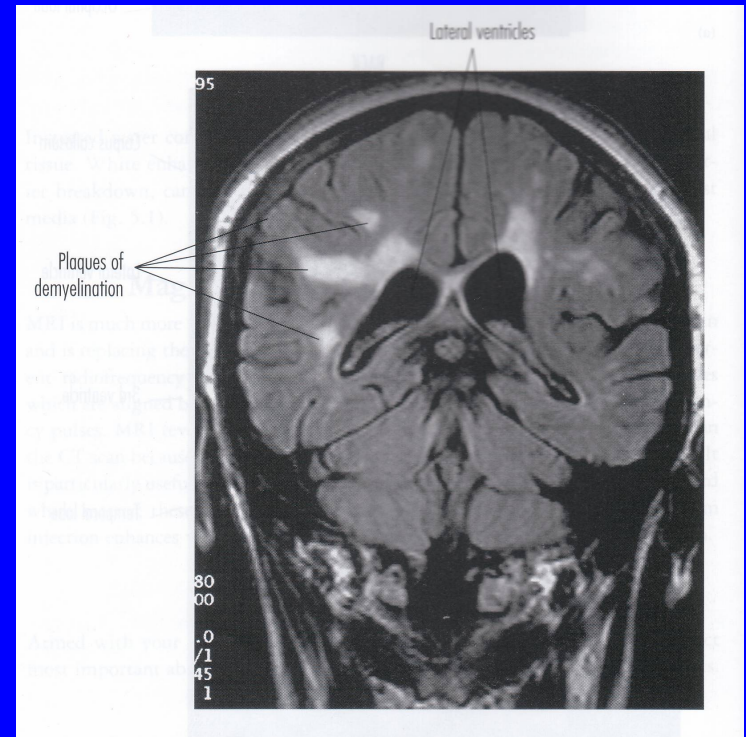
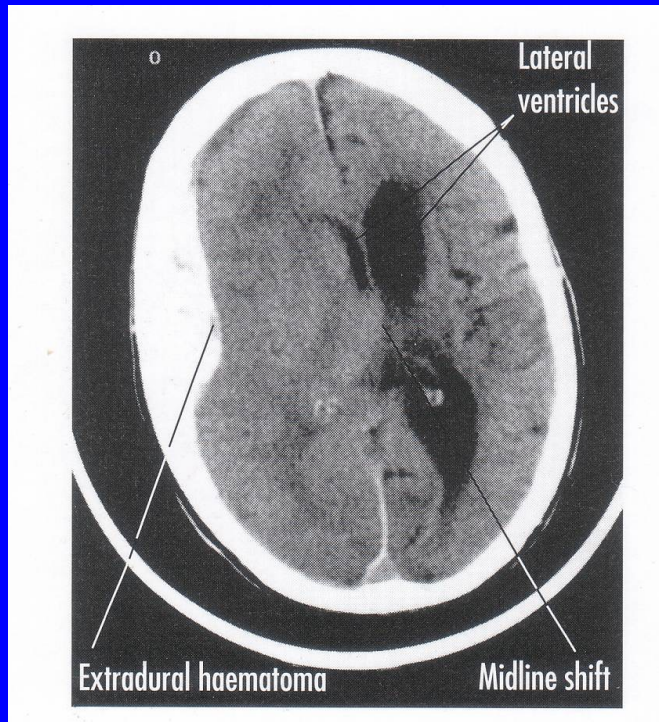
# Paralysis Due to Lesions of the Upper Motor Neurons

*Test for tone. Spasticity (hypertonia)*

*Exaggerated reflexes (hyperreflexia)*

*Pathological reflexes (Babinski sign) and clonus*

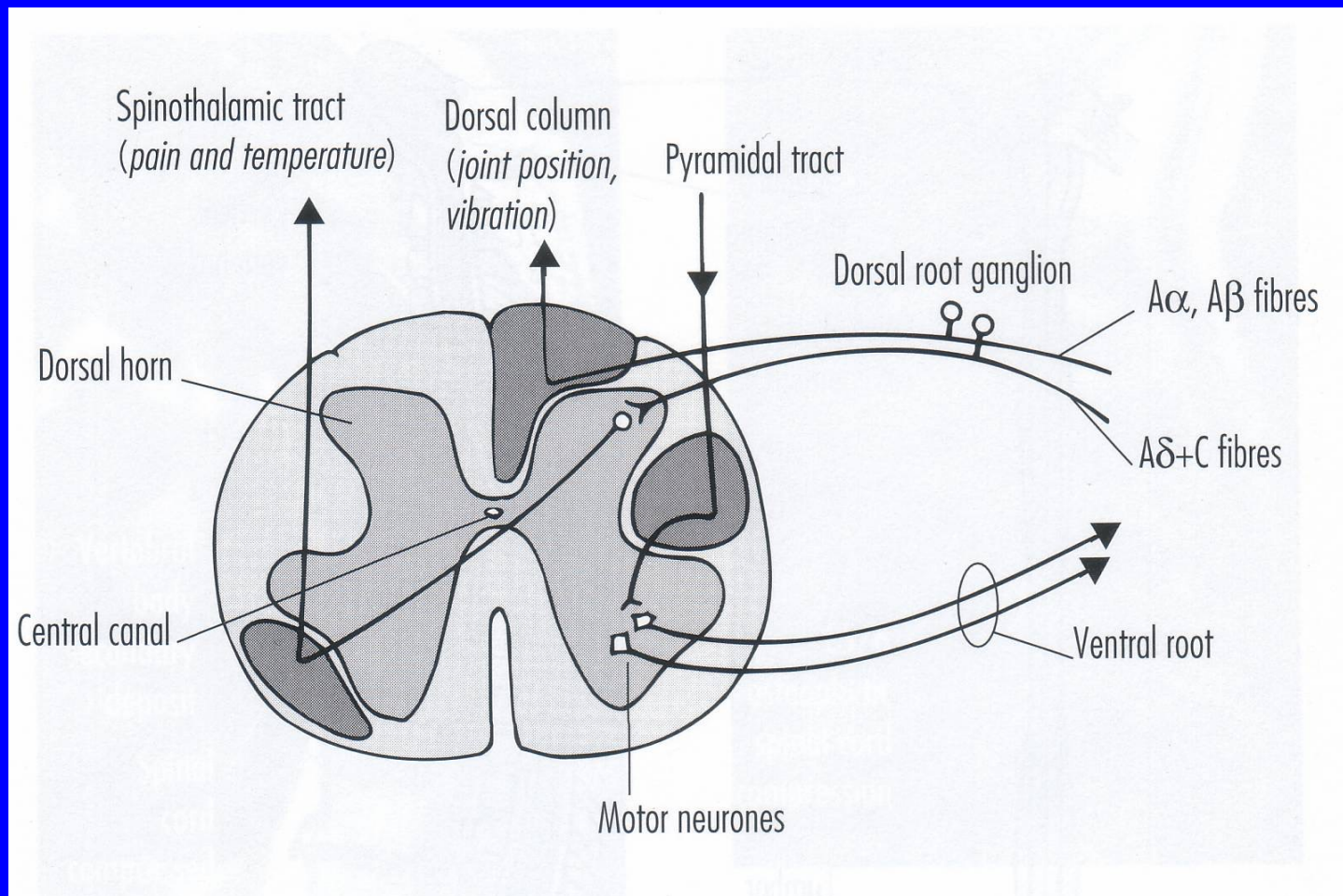
# DISEASES with UPPER MOTOR NEURON SYNDROME



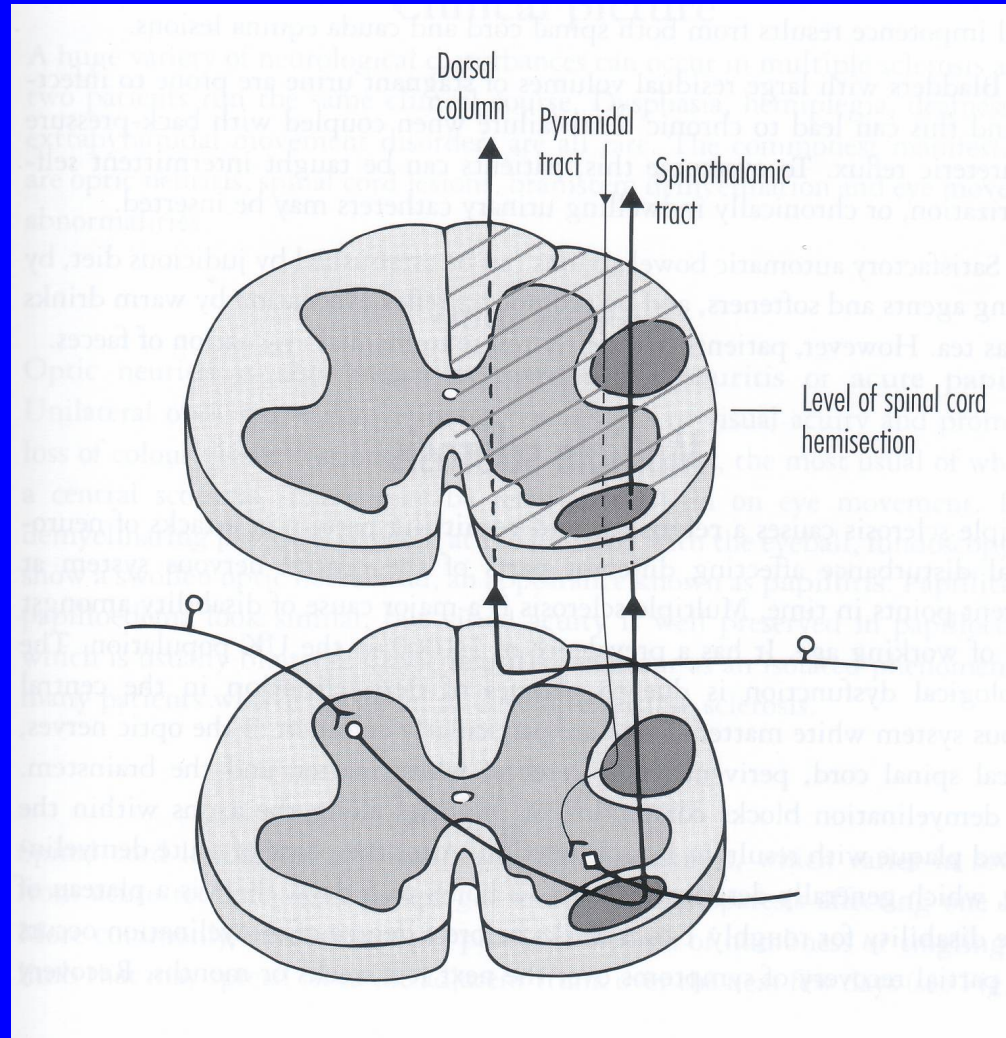
# AMYOTROPHIC LATERAL SCLEROSIS (ALS)

It is a nosological entity whose clinical picture is composed of elements specific to lower motor neuron syndrome and upper motor neuron syndrome (hyperreflexia and pathological signs in atrophied muscle territories). This phenomenon is explained by the fact that the pathological process mosaically attacks the pyramidal path and the anterior medullary horns.

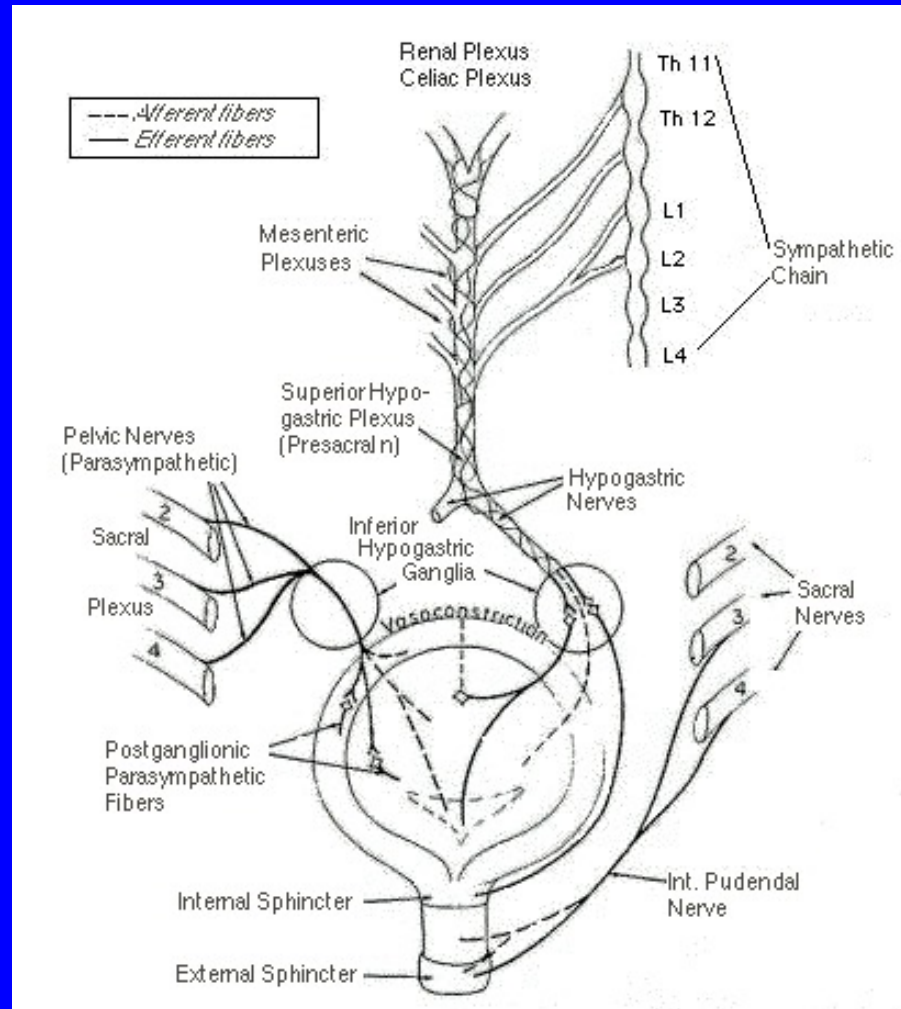
# Clinical manifestations caused by spinal cord injury in cross section at different levels



# BROWN-SÉQUARD SYNDROME



# SPHINCTER DISTURBANCES



**THE END**

**QUESTIONS ???**