Motor tracts of spinal cord

Dr Nawal Mustafa Al-Shannan

Objectives: •

1. to recognizethe motor tracts

2. the pathway of these tracts in general

3. The diseases linked to their defects

Descending tracts of the spinal cord :

2 motor neuron

: upper motor neuron (UMN)

: lower motor neuron (LMN)

Motor

-

All voluntary movements done as :

Nerve impulse from C.C

▼

anterior horn cells of spinal cord

▼

striated voluntary skeletal muscles

UMN = pyramidal tract

1. Cerebral Cortex

▼

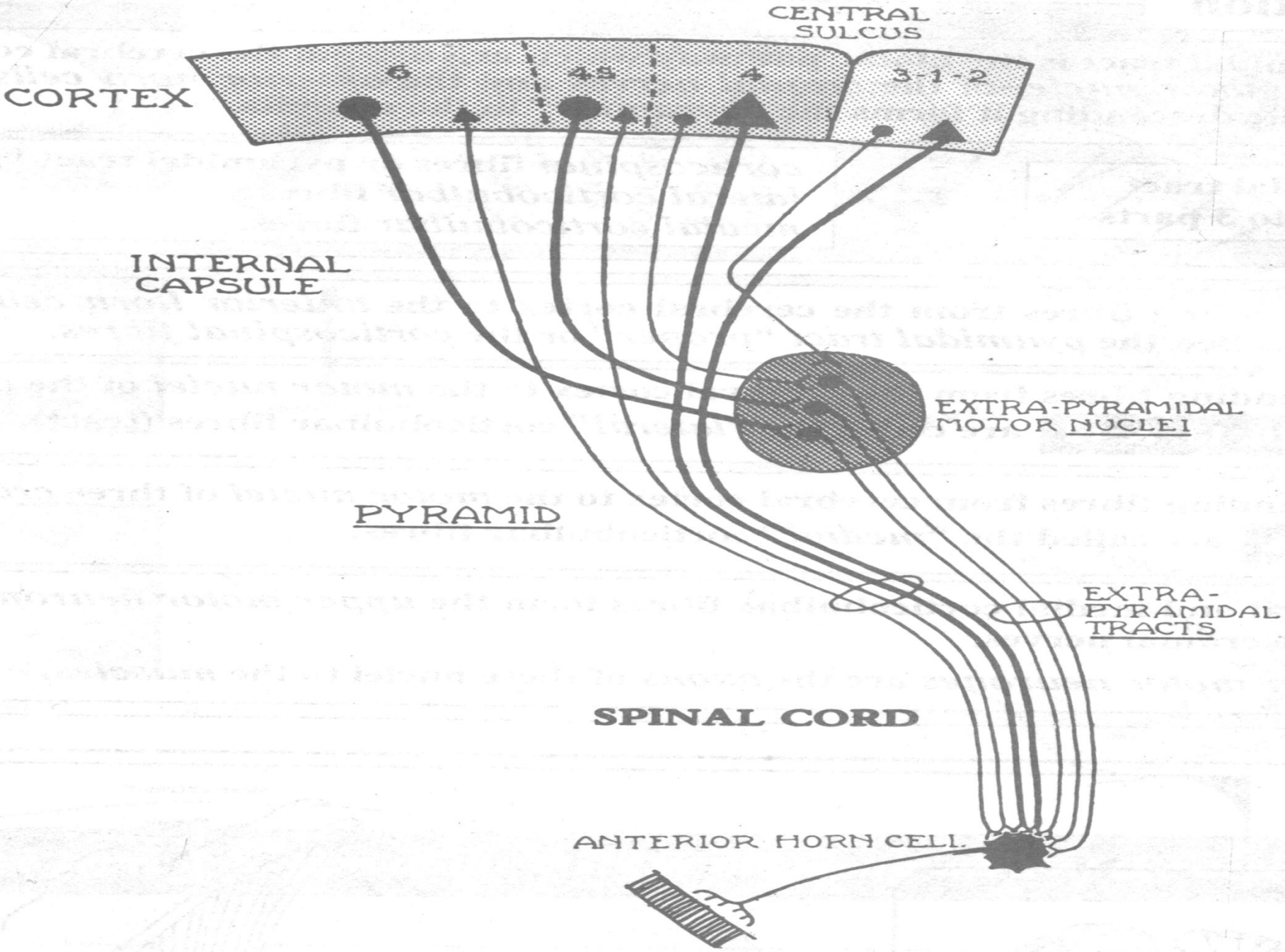
ant horn cells of spinal cord

LMN

2. ant horn cells of spinal cord by axons of periphral nerves

▼

muscles


CENTRAL SULCUS
CORTEX
6
4S
4
3-1-2
INTERNAL CAPSULE
EXTRA-PYRAMIDAL MOTOR NUCLEI
PYRAMID
EXTRA-PYRAMIDAL TRACTS
SPINAL CORD
ANTERIOR HORN CELL

Descending tracts :

1.pyramidal tract

2. extra pyramidal tract

***** Pyramidal tract occupy pyramid on the anterior surface of medulla**

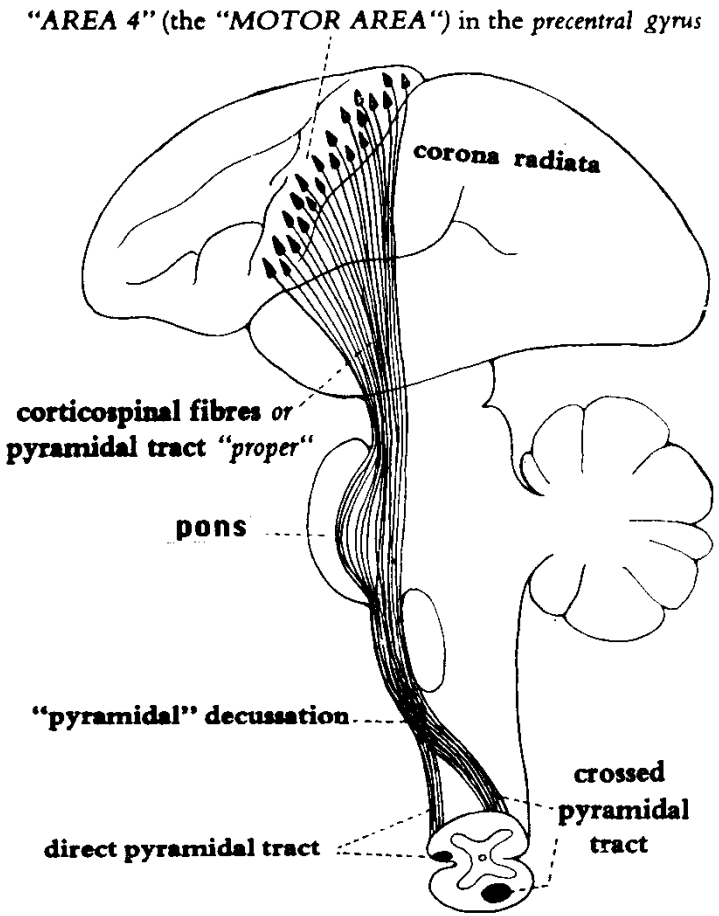
***** Extrapyramidal occupy many different positions in the brain**

Notes:

**** gross movement of the baby early in his life is done by extra pyramidal tract while pyramidal tract responsible for skillful fine movement like typing, playing piano.**

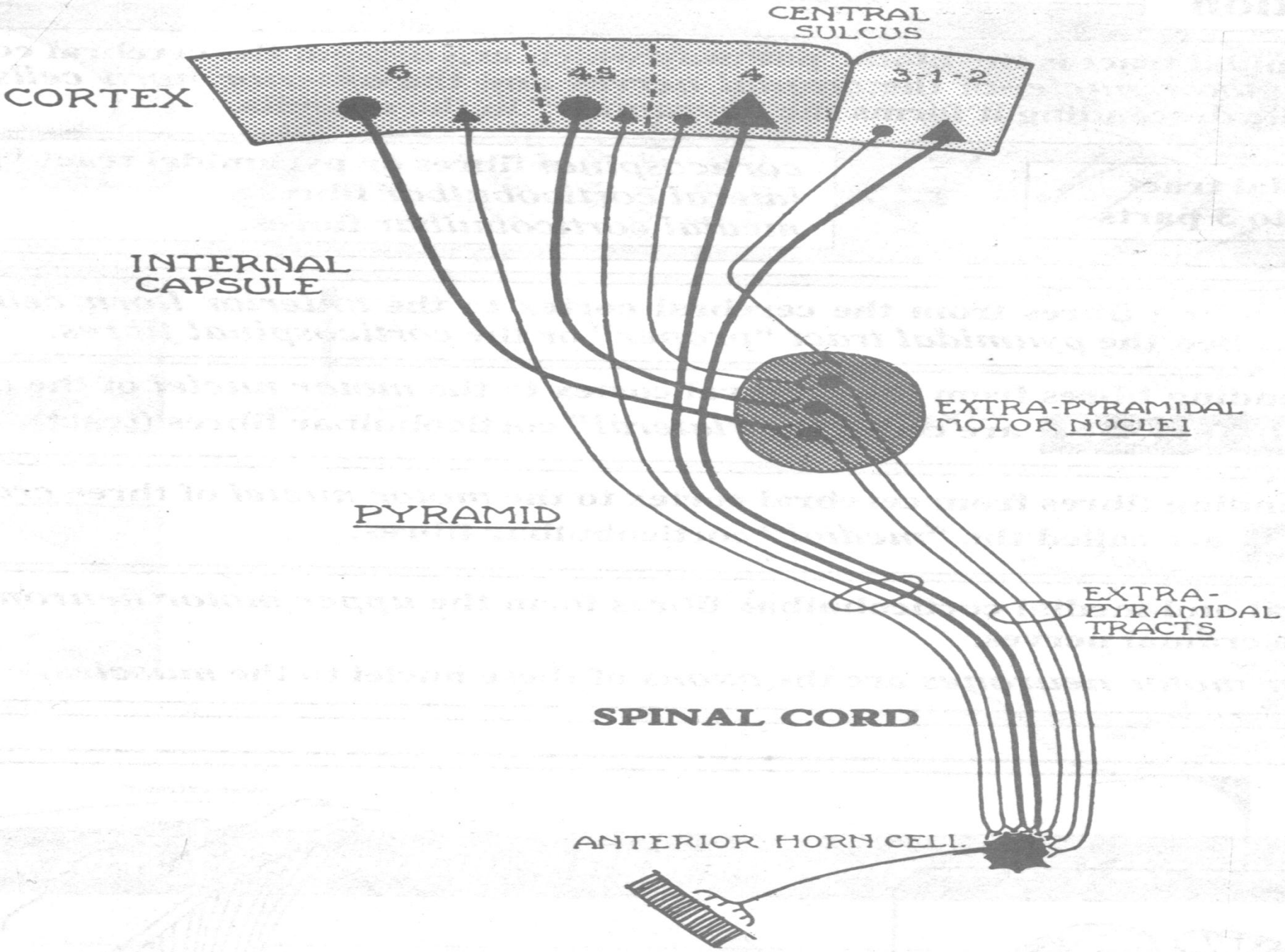
**** functionally these tracts help each other.**

****anatomically pyramidal and many extrapyramidal tracts descend very close to each other? Lesions usually involve both**



The pyramidal tract.

Pyramidal tract	Extra pyramidal tract
* one neuron C.C to A.H.C non stop= jet tract	many neurons (synapses) C.C to A.H.C train with many stops
Pyramid of medulla	**medulla**
* arise from a localized area called motor area 4 In precentral gyrus of frontal lobe.	scattered in different area widely distributed area from different lobes of C.C
*all fibers cross to reach Opposite side 85% occur in lower half of medulla forming pyramidal decussation	some tracts are direct, while Others are crossed crossing occur at level of origin of extrapyramidal tract.


CENTRAL SULCUS
CORTEX
6
4S
4
3-1-2
INTERNAL CAPSULE
EXTRA-PYRAMIDAL MOTOR NUCLEI
PYRAMID
EXTRA-PYRAMIDAL TRACTS
SPINAL CORD
ANTERIOR HORN CELL

*functionally

Tone

facilitary or excitatory

: stimulation – increase tone

destruction - decrease tone and reflexes

facilitatory

others are inhabitary

stimulation decrease tone

destruction – increase tone and reflexes

Movements

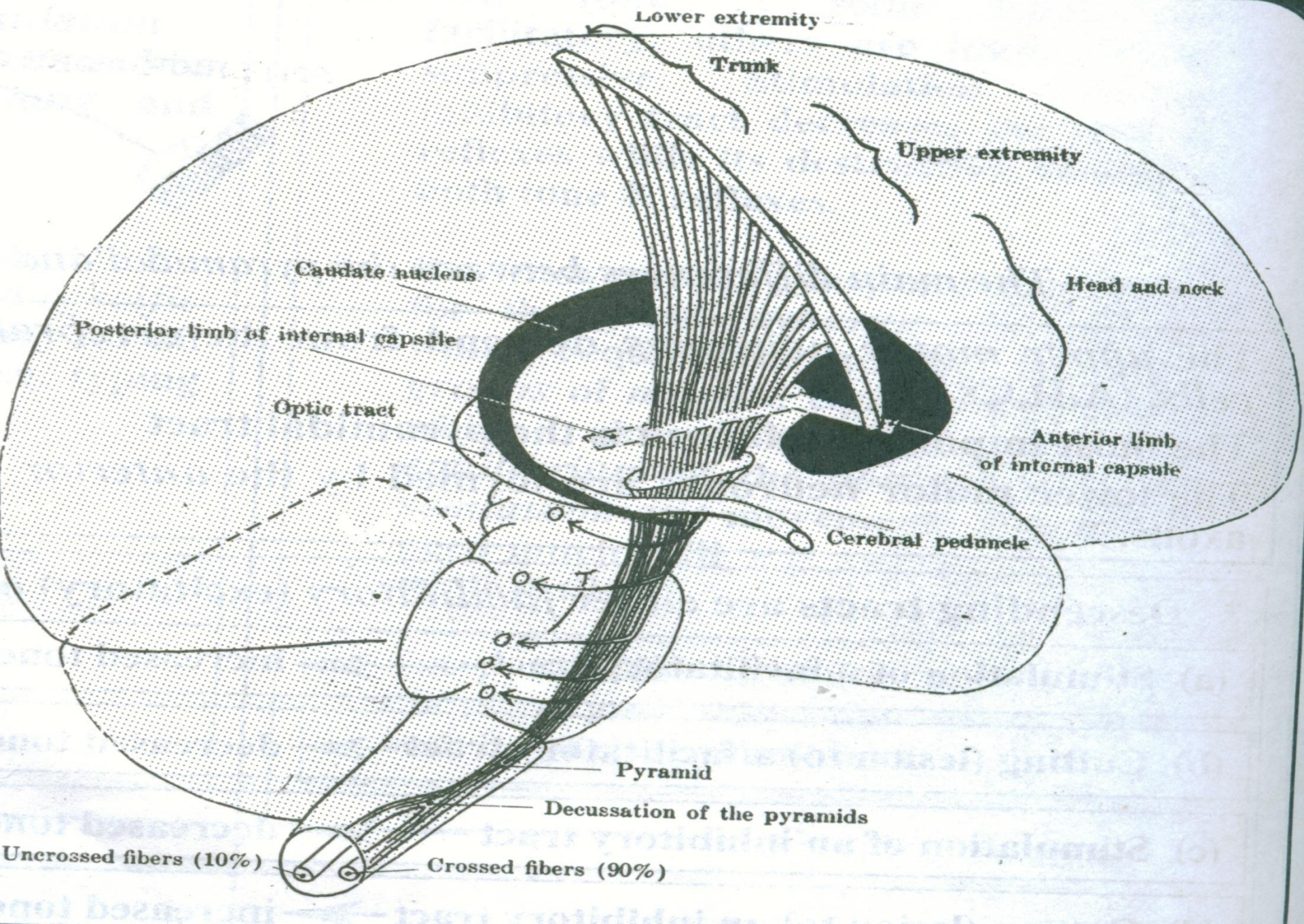
fine precise specific movements needed

e.g: typing

gross synergic movement large group of muscles

swinging of arms

.


Lower extremity
Trunk
Upper extremity
Head and neck
Caudate nucleus
Posterior limb of internal capsule
Optic tract
Anterior limb
of internal capsule
Cerebral peduncle
Pyramid
Decussation of the pyramids
Uncrossed fibers (10%)
Crossed fibers (90%)

Pyramidal tracts :

Motor pathway:

Pyramidal tract is divided into 3 parts

1. **pyramidal tract proper= corticospinal fibers**
   C.C by descending fibers to A.H.C

2. C.C by descending fibers to motor nuclei 5, 7, 9, 10 . 11. 12 are called lateral corticobulbar tract

3. C.C by descending tracts to motor nuclei of 3.4.6 are called medial corticobulbar fibers

lateral and medial corticobulbar fibers form UMN to motor nuclei of cranial nerves

axons of motor nuclei to muscles are LMN

Hemiplegia = paralysis of one half of the body

Monoplegia = paralysis of one limb only

Paraplegia = paralysis of both lower limbs

Quadriplegia = paralysis of 4 limbs

Extrapyramidal tract :

in premotor area of cerebral cortex

at basal ganglia and subthalamus

tracts arise from brain stem and ends at anterior horn cells of spinal cord

*** **they are** **3 single and** **3 paried tracts**

: Descending tracts are : total 11

*** **2 pyramidal**
direct
crossed

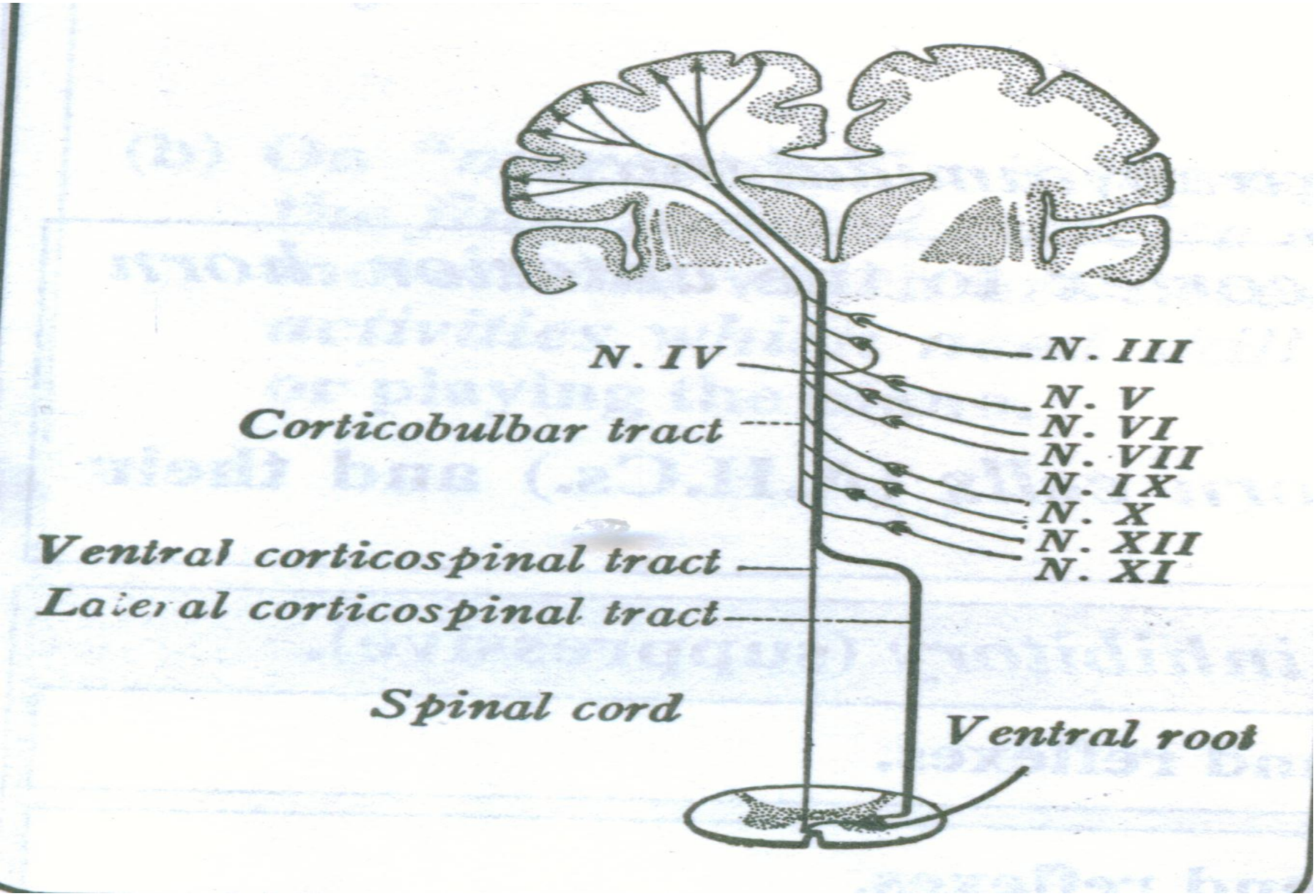
***9 **extrapyramidal**
3 single
1. **rubrospinal tract**
2. **olivospinal tract**
3. **sulcomarginal tract**

3 paired

*** 4 & 5 lateral and ventral tactospinal tract**

*** 6 & 7 lateral and ventral reticulospinal tract**

*** 8 &9 lateral and ventral vestibulospinal tract**


N. IV
N. III
N. V
Corticobulbar tract
N. VI
N. VII
N. IX
N. X
N. XII
N. XI
Ventral corticospinal tract
Lateral corticospinal tract
Spinal cord
Ventral root

Paralysis : **unability to use the muscle properly**

lesions of pyramidal tracts (UMNL) result in paralysis of voluntary movements .

Lesions of anterior horn cells (LMNL) , muscles are paralyzed .

2 types of paralysis: Flaccid and spastic

Flaccid	Spastic
*Destruction of ant.h.cells Roots,.	destruction of pyramidal tract
*muscles does not possess any tone or tendon reflex	increase tone ,reflexes flexors of arm and extensors of legs
*within few weeks muscles atrophied	tendons are exaggerated

* muscles in early atrophy shows fibrillation= fine twitching