**Descending Tract**

| Tract | Origin | Crossing Over | Function
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Corticospinal or pyramidal tract passes through the pyramid of medulla</td>
<td>Area 4,6 (3,1,2) of cerebral cortex</td>
<td>a) Lateral corticospinal tract decussates in lower part of medulla b) Anterior corticospinal tract crosses to opposite side in the corresponding spinal segment</td>
<td>Responsible for skillful voluntary movements</td>
</tr>
<tr>
<td>Rubrospinal tract</td>
<td>Red nucleus of midbrain</td>
<td>Midbrain at the level of superior colliculus</td>
<td>Same as corticospinal tract</td>
</tr>
<tr>
<td>Tectospinal tract</td>
<td>Superior colliculus (Tectum of midbrain)</td>
<td>Midbrain at the level of superior colliculus</td>
<td>Reflex pathway for turning head and moving arm in response to visual and hearing stimuli</td>
</tr>
<tr>
<td>Olivospinal tract</td>
<td>Interior olivary nucleus (Uncrossed)</td>
<td>Uncertain</td>
<td></td>
</tr>
</tbody>
</table>

**Blood supply**

- **Artery**
  - 1. Anterior spinal artery (1 in number)
  - 2. Posterior spinal arteries (2 in number)
  - 3. Segmental spinal branches
    - (a) Vertebral artery (2nd part)
    - (b) Deep cervical artery
    - (c) Ascending cervical artery
    - (d) Posterior intercostal arteries
    - (e) Lumbar arteries

- **Branch of**
  - 4th part of vertebral artery
  - 4th part of vertebral artery, sometimes from posterior inferior cerebellar artery

- **Territory of supply**
  - Ventral 2/3rd cross section of spinal cord
  - Posterior 1/3rd of the cross-section of spinal cord

- Subclavian artery
- Costocervical trunk of 2nd part of subclavian
- Branch of thyrocervical trunk
- Thoracic aorta
- Abdominal aorta
- (a), (b) and (c) supply the cervical segments and uppermost thoracic segments up to T2
- (d) and (e) supply rest of the cord
**SPINAL CORD**

1. The spinal nerve pairs are - *(WB 2K; TN 91; Kerala 90)*
   a) 28  
   b) 30
   c) 31  
   d) 33
   e) 35

2. Subarachnoid space ends at - *(NEET/DNB Pattern)*
   a) D12  
   b) L2
   c) L5  
   d) S2

3. In adults, the spinal cord normally ends at - *(AI 06)*
   a) Lower border of L1  
   b) Lower border of L3
   c) Lower border of S1  
   d) Lower border of L5

4. The spinal cord in infants ends at the level of - *(Delhi 96; PGI 95; AI 95)*
   a) L1  
   b) L2
   c) L3  
   d) L4

5. In an adult, the spinal cord ends at - *(AI 96)*
   a) T1, L1  
   b) L1, L2
   c) L1, L4  
   d) S1, S2

6. Which of the following tracts is seen in the posterior column of spinal cord? *(Jipmer 05, PGI 01)*
   a) Lateral spinothalamic tract
   b) Fasciculus gracilis
   c) Fasciculus cuneatus
   d) Rubrospinal tract
   e) Posterior spinocerebellar

7. Which of the following tracts is concerned with pain and temperature? *(AI 08)*
   a) Pyramidal tract
   b) Anterior spinothalamic tract
   c) Lateral spinothalamic tract
   d) Dorsal spinocerebellar tract

8. Which of the following sensations is not carried by the posterior column tract? *(AI 08)*
   a) Touch
   b) Temperature
   c) Pressure
   d) Vibration

9. True about spinal cord? *(PGI June 08)*
   a) In adults spinal cord ends at lower border of L1 vertebra
   b) In newborn may extend up to L3
   c) Cauda equina extends from lumbar vertebra to coccyx
   d) In embryonic period cord extends up to coccyx
   e) Has same diameter all throughout the length

10. These ventral spinal rootlets are more prone to injury during decompressive operations because they are shorter and exit in a more horizontal direction - *(AIIMS 02; Kerala 90; TN 91)*
    a) C5  
    b) C6
    c) C7  
    d) T1

THE BACK

11. Which is not a characteristic of a typical cervical vertebra? *(NEET/DNB Pattern, AIIMS May 07)*
    a) Has a triangular vertebral canal
    b) Has foramen transversarium
    c) Superior articular facet is directed backwards and upwards
    d) Has a large vertebral body

12. Dislocation of the vertebra is uncommon in thoracic region because in this region - *(AI)*
   a) The articular process are interlocked
   b) The vertebral body is long
   c) Anterior longitudinal ligament is strong
   d) Spinous process is long and pointed

13. Which is the most prominent spinous process? *(NEET/DNB Pa)*
    a) T1  
    b) C7 *(NEET/DNB Pa)*
    c) C6  
    d) L5

14. The movement at the following joint permits person to look towards the right or left - *(AI)*
    a) Atlanto-occipital joint
    b) Atlanto-axial joint
    c) C2-C3 joint
    d) C3-C4 joint

15. Transverse ligament of atlas is part of - *(AIIMS 92, A)*
    a) Cruciform ligament
    b) Ligament flava
    c) Anterior longitudinal ligament
    d) Posterior longitudinal ligament

16. The lumbar region of the vertebral column permits all of the following movements except - *(AI)*
    a) Flexion
    b) Extension
    c) Lateral flexion
    d) Rotation

17. Flexor of lumbar spine is/are - *(PGI May)*
    a) Erector spinis
    b) External oblique muscle
    c) Internal oblique muscle
    d) Rectus abdominis
    e) Psoas major

18. Which of this part of vertebral canal will form secondary curves with concavity backwards? *(AI)*
    a) Cervical
    b) Thoracic
    c) Sacral
    d) Coccyx

19. In epidural lumbar puncture, all structure is pierced except - *(AIIMS)*
    a) Posterior longitudinal ligament
    b) Ligamentous flavum
    c) Interspinous ligament
    d) Supraspinous ligament

20. ‘Chassaignac’s tubercle’ is - *(PGI)*
    a) Erb’s point
    b) Carotid tubercle on C6 vertebra
    c) Found on first rib
    d) Medial condyle of humerus

21. Chassaignac’s tubercule lies at level of - *(Bihar)*
    a) Erb’s point
    b) Stellate ganglion
    c) Atlas
    d) Odontoid process
Pathways of cutaneous sensation

\[ \Rightarrow \text{Pain/Tact.} \quad \xrightarrow{\text{Lat. Spinothalamic}} \]
\[ \xrightarrow{\text{cross in some segment}} \]
\[ \Rightarrow \text{Touch} \quad \text{Non discriminatory} \]
\[ \text{Pressure} \quad \text{Discriminatory ND} \]

Gracile's Cuneatus Upper Limb
\[ \text{Cross in medulla} \]
\[ \text{Medial Laminus} \]
\[ \text{Thalamus} \]

\[ \text{Ant. Spinothalamic} \quad \text{Cross after 2-3 segm} \]
\[ \text{Join Medial Laminus} \]

Eckovation App
Group Code: 873541

Notes of Dr. Ravindra Goswami (IAS-2015, AIR-153)
Unconscious proprioception

Fine coordination
\(\downarrow\)
Dorsal Spine
\(\downarrow\)
Inf. Cerebellar Peduncle
\(\downarrow\)
Cerebellum
\(\downarrow\)
Ascending Ipsilateral
Do not cross
Inf. Cerebellar Peduncle
So ultimately reach to some side of Cerebellum

Syngomyelia

Aut. Spin
2-3 Segment
Lad Spina
UMN - LMN

Brown Squared Hemisection

Touche Pain Temp. less Caudal
\(\downarrow\) Ipsi
Pyramidal + Proprioception
\(\downarrow\) Accurate movement
Descending tract
Cerebrum

Red nucleus
Midbrain
Sup. colliculi

Medulla

Vestibular

Tectospinal
Rubro

Crossed +
Corticospinal
Uncrossed
Corticospinal
Functions of Pyramidal
Coeticospinal

(i) dtr. CS = Control of voluntary movement (fine)
(ii) Ant. CS = Gross movement
(iii) Pathway of Sup. reflexes - Plantar
     Abdom. cremasteric

(iv) Some CS end at a motor neuron, some may end at
centerneurons which may excite
or inhibit a motor neuron,
thus effect of CS may be excitatory
or inhibitory.

(v) Fibers from somatosensory area I & II
help in sensory motor coordination

Coeticobulbar
- voluntary control of mms. of larynx
  pharynx, palate
Extrapyramidal
- Rubrospinal = Red nucleus = Facilitate flexors
- Rubrospinal = Red nucleus = Inhibit Extensors
  - So control deceleration
  - Rigidity
  
- Tectospinal = Supercollum = Reflex Postural
  - From visual & auditory stimuli
  - Head turning
- Reticulospinal = Reticular
  - In motor neuron control
  - Act in muscle, sleep, BP
  - Facilitate Antigeo
- Vestibulospinal
- Medial longitudinal fasciculus

Parkinson vs Extrapyramidal
- Specific group of NW
- Spasticity
- Rigidly
**LMN**
- Single n. or muscles.
- Flaccid
- Fasciculation
- Dususe atrophy
- All reflexes lost
- Babinski 

**UNN**
- Group affer.
- Spastic (Cause to release phenomenon)
  - Not severe
- Deep T averse
  - N/C discharging
  - Spor. only Abdo. Osym. lost
- Abnormal (L5, S1)
Table 23.4: Neurons of sensory tracts

<table>
<thead>
<tr>
<th>Lateral spinothalamic</th>
<th>Dorsal root ganglion</th>
<th>Substantia gelatinosa</th>
<th>Posterolateral ventral nucleus of thalamus</th>
<th>Clinical tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior spinothalamic</td>
<td></td>
<td>Nucleus proprius</td>
<td></td>
<td>1. Joint sense</td>
</tr>
<tr>
<td>Fasciculus gracilis</td>
<td></td>
<td>Nucleus gracilis in medulla oblongata</td>
<td>2. Vibration sense</td>
<td>2. Temperature with hot and cold water in the test tubes</td>
</tr>
<tr>
<td>Fasciculus cuneatus</td>
<td></td>
<td>Nucleus cuneatus in medulla oblongata</td>
<td>3. Tactile localization</td>
<td></td>
</tr>
<tr>
<td>Dorsal spinocerebellar</td>
<td>Clark’s column</td>
<td>Nil</td>
<td>4. Tactile discrimination</td>
<td></td>
</tr>
<tr>
<td>Ventral spinocerebellar</td>
<td>Neurons of posterior horn</td>
<td>Nil</td>
<td>5. Romberg’s test</td>
<td>5. Rhomberg’s test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Stereognosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7. Crude touch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Crude pressure</td>
<td>8. Crude pressure</td>
</tr>
</tbody>
</table>

All cerebellar tests, like the finger nose and heel-knee tests, for intention tremors.

Fig. 23.13: Spinothalamic pathways

Fig. 23.14: Tracts of dorsal columns

that is touched), stereognosis (ability to recognise shape of object held in hand) and sense of vibration are carried by fasciculus gracilis and fasciculus cuneatus.

2. Fasciculus gracilis (tract of Goll): It commences at the caudal limit of spinal cord and is composed mainly of the long ascending branches of the medial division of fibres of dorsal nerve roots. These are the first