SPINAL CORD AND SPINAL CORD, ITS AGE-RELATED FEATURES. THE BRAIN GENERAL APPEARANCES.

Nuraddinov Egamberdi Xudoyor o'g'li

Nurmatova Shaxnoza Sirojiddin qizi

Students of the 1st year group 105-b of the Faculty of Dentistry of the Tashkent State Dental Institute

Khalilov Sanjar Abdivohid ugli

Assistant teacher of the Department of Anatomy of the Tashkent State Dental Institute

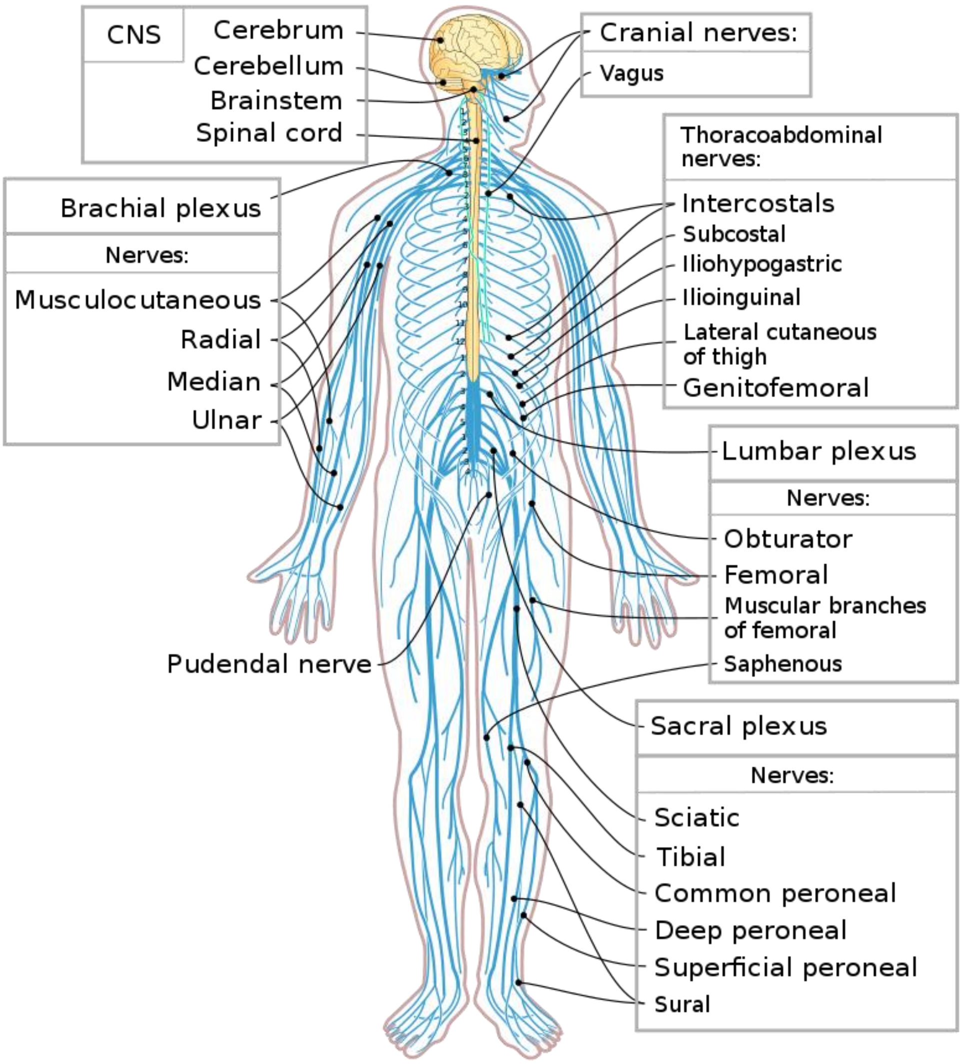
https://doi.org/10.5281/zenodo.11083950

Annotation: This article is about Spinal cord and spinal cord, its age-related features. The brain general appearance. The spinal cord is responsible for transmitting nerve signals from the motor cortex to the body and from the afferent fibers of sensory neurons to the sensory cortex. It also maintains a coordinating center for many reflexes and reflex arcs that independently control reflexes.[1] It is also home to groups of spinal interneurons that form neural loops known as central pattern generators.

Key words: Spinal cord, brain, body, neurons, nerve.

The spinal cord is a long, thin, tube-like structure made of nerve tissue, which extends from the medulla oblongata in the brain stem to the lumbar region of the spine. It covers the central canal of the spinal column, which stores cerebrospinal fluid. The brain and spinal cord together make up the central nervous system (CNS). In humans, the spinal cord begins at the occiput, passes through a large foramen, and enters the spinal canal at the beginning of the cervical vertebrae. The spinal cord extends downwards to the space between the first and second lumbar vertebrae and ends there. The surrounding bony spine protects the relatively short spinal cord. It is approximately 45 cm long in males and approximately 43 cm long in females. The diameter of the spinal cord varies from 13 mm in the neck and lumbar regions to 6.4 mm in the chest region.

The spinal cord is responsible for transmitting nerve signals from the motor cortex to the body and from the afferent fibers of sensory neurons to the sensory cortex. It also maintains a coordinating center for many reflexes and reflex arcs that independently control reflexes.[1] It is also home to groups of spinal interneurons that form neural loops known as central pattern generators. These loops are responsible for the control of rhythmic movements such as walking [2].



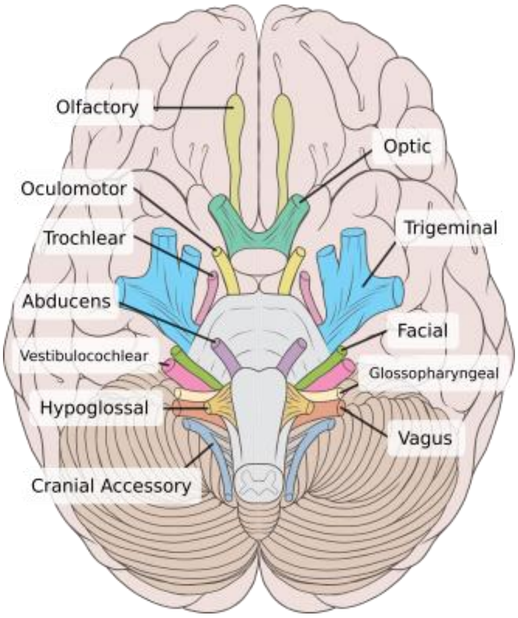
The spinal cord is the main pathway connecting the brain and the peripheral nervous system.[3][4] Much shorter than the vertebral column that protects it, the human spinal cord originates at the brain stem, passes through a large foramen, and continues through the conus medullaris near the second lumbar vertebra before terminating in a fibrous extension known as the filum terminale.

It is approximately 45 cm long in men and 43 cm long in women, oval in shape and widened at the neck and waist. The cervical spine, extending from C5 to T1, is the area that receives sensory impulses from the arms and body and sends motor impulses. The lumbar spine is an area between L1 and S3 that receives sensory impulses from the arm and sends motor impulses to the legs.

The spinal cord is a continuation of the caudal portion of the medulla oblongata, extending from the base of the skull to the first lumbar vertebra of the body. It does not extend the full length of the spine in adults. It consists of 31 segments with one pair of sensory roots and one pair of motor roots. The nerve roots then merge into bilaterally symmetrical pairs of spinal nerves. The peripheral nervous system consists of these roots, nerves and ganglia (nodes).

Dorsal roots are afferent bundles that receive sensory impulses from internal organs related to the skin, muscles, and brain. Roots terminate in dorsal root ganglia, which are composed of

corresponding neuronal cell bodies. The anterior roots consist of efferent fibers and arise from the cell bodies of motor neurons found in the anterior gray branches of the spinal cord.
The spinal cord (and brain) is protected by three layers of tissue or membranes, called meninges, which surround the canal. The dura forms the outermost layer and a hard protective covering. The space between the dura mater and the surrounding vertebral bones is called the epidural space. The epidural space is filled with fatty tissue and contains the vascular system. The reticulate veil, the middle protective layer, is so named because of its open, spider-web-like appearance. The space between the retina and the underlying soft tissue is called the subarachnoid space. The subarachnoid space contains cerebrospinal fluid, which can be examined through a lumbar puncture procedure. The delicate soft tissue is the innermost protective layer and is closely connected to the surface of the spinal cord. The spinal cord is stabilized by the dentate ligaments that attach to the dura mater, and these ligaments emerge from the dura mater between their lateral, posterior, and anterior roots. The dural sac ends in the area of the second iliac spine.



In cross-section, the peripheral part of the spinal cord contains neuronal white matter tracts consisting of sensory and motor axons. Inside this peripheral area is the gray matter and consists of nerve cell bodies arranged along three gray columns that give it a butterfly shape. This central area surrounds the central canal, which is a continuation of the fourth ventricle and contains cerebrospinal fluid. The spinal cord is elliptical in cross-section, dorsolaterally compressed. Two prominent grooves or egates run along its length. the posterior median egate (lat. sulcus medianus posterior) is the posterior egate and the anterior middle egate (lat. sulcus medianus anterior) is the egate on the front side.
Spinal cord segments
The human spinal cord is divided into segments where pairs of spinal nerves (mixed; sensory and motor) form. Six to eight motor nerve rootlets emerge from the right and left ventrolateral egates and are arranged in a very orderly fashion. Nerve roots unite to form nerve roots. Similarly, sensory nerve roots from the right and left dorsolateral egates form the sensory nerve roots. The anterior (ventral) (motor) and posterior (dorsal) (sensory) roots join to form one spinal nerve (mixed; sensory and motor) on each side of the spinal cord. Spinal nerves, except C1 and C2, originate within the intervertebral foramen. These rootlets

form the demarcation that separates the central and peripheral nervous systems. The gray column, (like the three gray column areas) in the center of the spinal cord, is butterfly-shaped and consists of interneurons, motor neurons, neuroglial cell bodies, and unmyelinated axons. The anterior and posterior gray matter are projections of the superior gray matter and are known as spinal cords. The gray columns and gray commissure together form the "gray H".

The white matter lies outside the gray matter and consists almost entirely of motor and sensory myelinated axons. White matter "columns" carry information down or up the spinal cord. The spinal cord actually ends in an area called the conus medullaris, but the soft tissue continues as an extension called the filum terminale, eventually leading to the coccyx. Cauda equina ("horse's tail") is a bundle of nerves that descends from the conus medullaris down the spine to the tail. Cauda equina is formed because the spinal cord stops growing at about four years of age, while the spine continues to grow into adulthood. This causes the coccygeal spinal nerves to appear in the upper lumbar region.

In the central nervous system (CNS), nerve cell bodies are arranged in functional clusters called nuclei. Axons in the MNS are grouped into tracts.

There are 31 segments in the human spinal cord:

8 cervical segments form 8 pairs of cervical nerves (C1 spinal nerves exit between the greater foramen and C1 vertebra; C2 nerves exit between the posterior arch of the C1 vertebra and the lamina of C2; C3–C8 spinal nerves exit from the intervertebral foramen above the corresponding vertebra, except for the C8 pair , it originates between the C7 and T1 vertebrae)

The 12 thoracic segments form 12 pairs of thoracic nerves

5 lumbar segments form 5 pairs of lumbar nerves

5 caudal segments form 5 pairs of caudal nerves

1 tail segment

Injury

Main article: Spinal cord injuries

Spinal cord injuries can result from trauma to the spine (sprains, bruises, compressions, splits, cuts, etc.). Vertebral bones or intervertebral discs can break, resulting in a sharp fragment of bone sticking into the spinal cord. Typically, victims of spinal cord injuries suffer from loss of sensation in certain parts of the body. In mild cases, the victim only suffers from loss of function in an arm or leg. Relatively severe injuries can cause paraplegia, tetraplegia (also known as quadriplegia), or paralysis of the entire body below the spinal cord.

Injury to upper motor neuron axons in the spinal cord causes a characteristic ipsilateral deficit. These include hyperreflexia, hypertension, and muscle weakness. Lower motor neuron injury causes its own characteristic deficits. The myotome is affected by the injury, rather than the complete deficiency side. In addition, lower motor neurons are characterized by muscle weakness, hypotonia, hyporeflexia, and muscle atrophy.

Spinal shock and neurogenic shock can result from spinal cord injury. Spinal shock is usually brief, lasting only 24-48 hours, and is a temporary loss of sensory and motor functions. Neurogenic shock lasts for weeks and may cause loss of muscle tone due to disuse of the muscles below the injury site.

Conclusion: In to sum up the brain controls how we think, learn, move, and feel. The spinal cord carries messages back and forth between the brain and the nerves that run throughout the body.

References:

1.Mathon, Anthea. Human biology and health, 1st, Englewood Cliffs, NJ: Prentice Hall, 1993 — pp. 132–144. ISBN 978-0-13-981176-0.
2.Guertin, PA (2012). "Central pattern generator for locomotion: anatomical, physiological, and pathophysiological considerations.". Frontiers in Neurology 3: 183. doi:10.3389/fneur.2012.00183. PMID 23403923. PMC 3567435.
3.Myers, Gary. Exploring Psychology. Worth Publishers, 2009-12-25 — 41 pages. ISBN 978-1429216357.
4.Squire, Larry Squire. Fundamental neuroscience, 4th, Amsterdam: Elsevier/Academic Press, 2013 — 628 pages. ISBN 978-0-12-385-870-2.
5."Spinal Cord Gross Anatomy". Accessed: December 27, 2015.
6.Harrison, Megan; O'Brien, Aine; Adams, Lucy; Cowin, Gary; Ruitenberg, Marc J.; Sengul, Gulgun; Watson, Charles (March 2013). "Vertebral landmarks for the identification of spinal cord segments in the mouse". NeuroImage 68:22–29. doi:10.1016/j.neuroimage.2012.11.048. ISSN 1053-8119. PMID 23246856.
7.Kaufman, Bard "Spinal Cord - Development and Stem Cells". Life Map Discovery Compendium. Archived from the original on June 29, 2020. Accessed: 12-Dec-2015. (Archived at the Wayback Machine on 2020-06-29)
8.Kaufman, Bard "Spinal Cord-Development and Stem Cells". Stem Cell Development Compendium. Archived from the original on June 29, 2020. Accessed: 2-Dec-2015. (Archived at the Wayback Machine on 2020-06-29)