

## GUIDELINES

### Students' independent work during preparation to practical lesson

Academic discipline	HUMAN ANATOMY
Topic	LUMBAR PLEXUS. SACRAL PLEXUS. COCCYGEAL PLEXUS

#### **1. Relevance of the topic**

Lumbar, sacral and coccygeal plexuses innervate the skin of the abdomen, lower back and lower extremities and all the muscles of the lower limbs. Acquired knowledge is the basis for many fields of practical medicine, such as neurology, surgery and traumatology.

#### **2. Specific objectives**

After the lesson the student should know and be able to:

- describe the sources of the formation of the lumbar plexus;
- classify the nerves of the lumbar plexus;
- to be able to demonstrate and define the branches of the lumbar plexus;
- describe sources of sacral plexus formation;
- classify sacral plexus nerves;
- be able to demonstrate and identify short and long branches of the sacral plexus;
- describe the sources of formation coccygeal plexus;
- classify coccygeal plexus nerves;
- be able to demonstrate and identify branches of coccygeal plexus;
- to explain the innervation of muscles and skin in the areas of the lower back and lower extremity.

#### **3. Basic level of preparation**

For practical this lesson a student should know and be able:

- to know the anatomy of the spine, pelvis, lower extremities;
- to analyze and show large and small pelvis, their bones;
- to analyze and demonstrate bones and joints of the lower limbs;
- to demonstrate muscles of the abdomen, perineum, pelvic girdle and lower limbs;
- to know the anatomy (external and internal structure) of the spinal cord;
- to know the spinal nerve anatomy.

#### **4. Tasks for independent work during preparation for the classes**

*4.1. The list of key terms that student has to assimilate while preparing for classes*

The term	Definition
LUMBAR PLEXUS	The lumbar plexus is formed by the divisions of the first four lumbar nerves (L1-L4) and from contributions of the subcostal nerve (T12), which is the last thoracic nerve. Additionally, the ventral rami of the fourth lumbar nerve pass communicating branches, the lumbosacral trunk, to the sacral plexus. The nerves of the lumbar plexus pass in front of the hip joint and mainly support the anterior part of the thigh.
ILIOHYPOGASTRIC NERVE	The iliohypogastric nerve is a nerve that originates from the lumbar plexus that supplies sensation to skin over the lateral

	<p>gluteal and hypogastric regions and motor to the internal oblique and transverse abdominal muscles.</p> <p>The nerve emerges from the psoas major in the outer part of its upper border, and crosses in front of the quadratus lumborum to the iliac crest, running behind the kidneys. Near the iliac crest the iliohypogastric nerve then pierces through the transversus abdominis and divides between that muscle and the internal oblique muscle into a lateral and an anterior cutaneous branch.</p>
ILIOINGUINAL NERVE	<p>The ilioinguinal nerve is a branch of the first lumbar nerve (L1). It separates from the first lumbar nerve along with the larger iliohypogastric nerve. It emerges from the lateral border of the psoas major just inferior to the iliohypogastric, and passes obliquely across the quadratus lumborum and iliacus. The ilioinguinal nerve then perforates the transversus abdominis near the anterior part of the iliac crest, and communicates with the iliohypogastric nerve between the transversus and the internal oblique muscle.</p>
THE LATERAL CUTANEOUS NERVE OF THE THIGH	<p>The lateral cutaneous nerve of the thigh (also called the lateral femoral cutaneous nerve) is a cutaneous nerve that innervates the skin on the lateral part of the thigh.</p>
OBTURATOR NERVE	<p>The obturator nerve arises from the ventral divisions of the second, third, and fourth lumbar nerves in the lumbar plexus; the branch from the third is the largest, while that from the second is often very small.</p>
FEMORAL NERVE	<p>The femoral nerve is a nerve in the thigh that supplies skin on the upper thigh and inner leg, and the muscles that extend the knee.</p>
SACRAL PLEXUS	<p>The sacral plexus is a nerve plexus which provides motor and sensory nerves for the posterior thigh, most of the lower leg and foot, and part of the pelvis. It is part of the lumbosacral plexus and emerges from the lumbar vertebrae and sacral vertebrae (L4-S4). A sacral plexopathy is a disorder affecting the nerves of the sacral plexus, usually caused by trauma, nerve compression, vascular disease, or infection. Symptoms may include pain, loss of motor control, and sensory deficits.</p>
SCIATIC NERVE	<p>The sciatic nerve, also called the ischiadic</p>

	nerve, is a large nerve which is the largest branch of the sacral plexus and runs alongside the hip joint and down the lower limb.
PUDENDAL NERVE	The pudendal nerve is the main nerve of the perineum. It carries sensation from the external genitalia of both sexes and the skin around the anus and perineum, as well as the motor supply to various pelvic muscles, including the male or female external urethral sphincter and the external anal sphincter.
TIBIAL NERVE	The tibial nerve is a branch of the sciatic nerve. The tibial nerve passes through the popliteal fossa to pass below the arch of soleus.
PERONEAL NERVE	The peroneal nerve is a branch of the sciatic nerve, which supplies movement and sensation to the lower leg, foot and toes. Common peroneal nerve dysfunction is a type of peripheral neuropathy (damage to nerves outside the brain or spinal cord).
COCCYGEAL PLEXUS	The coccygeal plexus is a plexus of nerves near the coccyx bone. This plexus is formed by the fifth sacral nerve and the coccygeal nerve.

#### 4.2. Control questions for practical lessons

1. What lumbar plexus is formed from?
2. What sacral plexus is formed from?
3. What coccygeal plexus is formed from?
4. Name and show the branches of the lumbar plexus that innervate the skin of the lower limbs.
5. Name and show muscular branches of the lumbar plexus. Which group of muscles do they innervate?
6. Name and show short branches of the sacral plexus. Which group of muscles do they innervate?
7. Name and demonstrate long branches of the sacral plexus. Which group of muscles do they innervate?
8. Name the branches of sacral plexus innervating the skin of the lower limbs and demonstrate them.
9. Name and show muscular branches of coccygeal plexus. Which group of muscles do they innervate?

## 5. Sources

<b>Anatomy nomenclature</b>	<b>international</b>	<a href="http://anatom.ua/anatomical-terminology/">http://anatom.ua/anatomical-terminology/</a>
<b>LECTURE</b>		<a href="https://anatom.ua/basis/english/lectures/">https://anatom.ua/basis/english/lectures/</a>
<b>Textbook 'Human anatomy'</b>		PP. 292-301 <a href="http://anatom.ua/basis/english/online-book-in-english/">http://anatom.ua/basis/english/online-book-in-english/</a>
<b>Work Book (Coloring book)</b>		PP. 103-104
<b>Atlas of human anatomy (Sobotta)</b>		PP. 104, 112-114, 125-129
<b>QUIZES</b>		<a href="https://anatom.ua/basis/english/tests/">https://anatom.ua/basis/english/tests/</a>
<b>VIDEO</b>		<a href="https://anatom.ua/basis/video/">https://anatom.ua/basis/video/</a>

## 6. Materials for self-control

- Lumbar plexus is formed from \_\_\_\_\_
  - first four lumbar nerves (L1-L4) and subcostal nerve (T12)
  - first three lumbar nerves (L1-L3)
  - first five lumbar nerves (L1-L5)
  - subcostal nerve and L1-L2
  - nerves from L2-S2
- Ilioinguinal nerve starts from \_\_\_\_\_
  - L3
  - L2
  - L1
  - L5
  - L4
- In males genitofemoral nerve innervates \_\_\_\_\_
  - Transverse abdominal muscle
  - Glans penis
  - Scrotum
  - Prostate gland
  - Cremaster
- Femoral nerve originates from \_\_\_\_\_
  - L2-L5
  - L1-L2
  - Th12-L4
  - L2-L4
  - Th11-L5
- Quadriceps femoris is innervated by \_\_\_\_\_ nerve
  - Inferior gluteal
  - Obturator
  - Femoral
  - Sciatic
  - Superior gluteal
- Lateral cutaneous femoral nerve innervates the skin of \_\_\_\_\_
  - medial aspect of the thigh
  - latertal aspect of the thigh
  - anterior aspect of the thigh

- D. posterior aspect of the thigh
- E. superior aspect of the thigh

7. Sacral plexus is formed from \_\_\_\_\_

- A. L2-S1
- B. L1-S2
- C. L2-S5
- D. L4-S4
- E. S1-S5

8. Gluteus maximus is innervated by \_\_\_\_\_

- A. Superior gluteal nerve
- B. Inferior gluteal nerve
- C. Medial gluteal nerve
- D. Pudendal nerve
- E. Obturator nerve

9. Sciatic nerve originates from \_\_\_\_\_

- A. L1-L2
- B. L4-S3
- C. L1-S2
- D. L5-S2
- E. L5-S5

10. Which of the following is not a nerve of the sacral plexus?

- A. Median
- B. Sciatic
- C. Tibial
- D. Superior gluteal
- E. Pudendal

11. Sensation from external genital organs are carried by \_\_\_\_\_ nerve

- A. Femoral
- B. Sciatic
- C. Ulnar
- D. Pudendal
- E. Gluteal

12. Coccygeal plexus is formed by \_\_\_\_\_

- A. third, fourth and fifth sacral nerve and the coccygeal nerve
- B. fifth sacral nerve and the coccygeal nerve
- C. fourth and fifth sacral nerve and the coccygeal nerve
- D. second, third, fourth and fifth sacral nerve and the coccygeal nerve
- E. Only by coccygeal nerve

13. Femoral nerve belongs to \_\_\_\_\_ division of the lumbar plexus

- A. Anterior
- B. Posterior
- C. Medial
- D. Lateral
- E. Superior

14. Lumbosacral trunk originates from \_\_\_\_\_

- A. L1-L3
- B. Th12-L5

- C. L1-L5
- D. L4-L5
- E. L2-L5

15. Genitofemoral nerve originates from \_\_\_\_\_

- A. L1-L6
- B. L1-L2
- C. L1-L4
- D. L1-L5
- E. L1-S2

16. Nerves of the lumbar plexus pass through \_\_\_\_\_ muscle

- A. Quadratus lumborum
- B. Psoas major
- C. Quadriceps femoris
- D. Transverse abdominal
- E. Cremaster

17. Transversus abdominis is innervated by \_\_\_\_\_

- A. Abdominal and hypogastric nerves
- B. Femoral and inferior gluteal nerves
- C. Iliohypogastric and Ilioinguinal nerves
- D. Iliohypogastric only nerves
- E. Ilioinguinal nerves

18. What types of branches does lumbar plexus have?

- A. Muscular and parasympathetic
- B. Parasympathetic only
- C. Sympathetic only
- D. Sympathetic and cutaneous
- E. Cutaneous and muscular

19. Pectineus is innervated by \_\_\_\_\_

- A. Femoral nerve
- B. Pectineal nerve
- C. Obturator nerve
- D. Pectineal and obturator nerves
- E. Obturator and femoral nerves

20. Adductor magnus is innervated by \_\_\_\_\_ nerve

- A. Sciatic
- B. Pudendal
- C. Superior gluteal
- D. Femoral
- E. Obturator

## **ANSWERS**

<b>1</b>	<b>A</b>
<b>2</b>	<b>C</b>
<b>3</b>	<b>E</b>
<b>4</b>	<b>D</b>
<b>5</b>	<b>C</b>
<b>6</b>	<b>B</b>
<b>7</b>	<b>D</b>
<b>8</b>	<b>B</b>
<b>9</b>	<b>B</b>
<b>10</b>	<b>A</b>
<b>11</b>	<b>D</b>
<b>12</b>	<b>B</b>
<b>13</b>	<b>B</b>
<b>14</b>	<b>D</b>
<b>15</b>	<b>B</b>
<b>16</b>	<b>B</b>
<b>17</b>	<b>C</b>
<b>18</b>	<b>E</b>
<b>19</b>	<b>A</b>
<b>20</b>	<b>E</b>