



Lean in Medical Education: Reaching for Quality Management Tools to Teach Human Anatomy Effectively in a Multicultural and Multilingual Learning Space – ERASMUS+ Project LEANBODY - 2021-1-HU01-KA220-HED-000027542

DEPARTMENT OF ANATOMY AND CLINICAL ANATOMY

Continuous assessment as a possible predictive tool in a constructively aligned Anatomy curriculum

Ivan Banovac*, Nataša Kovačić, Ana Hladnik, Zdravko Petanjek, Vedran Katavić

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Background

- Coursestructure:
 - 24ECTSpoints – 220 teaching hours – 28weeks(2semesters)
- 300 students in domestic programme
- 100 students in international programme





Background

- Continuous assessment evaluated different domains and levels of knowledge:
 - Writtentest – Oralexamination – Open-endedquestionsandsketches – Objectivelystructuredpractical exams(OSPE):
 - Dissectionskills(OSPEI) • Recognition of anatomical structures (OSPE II)





Background

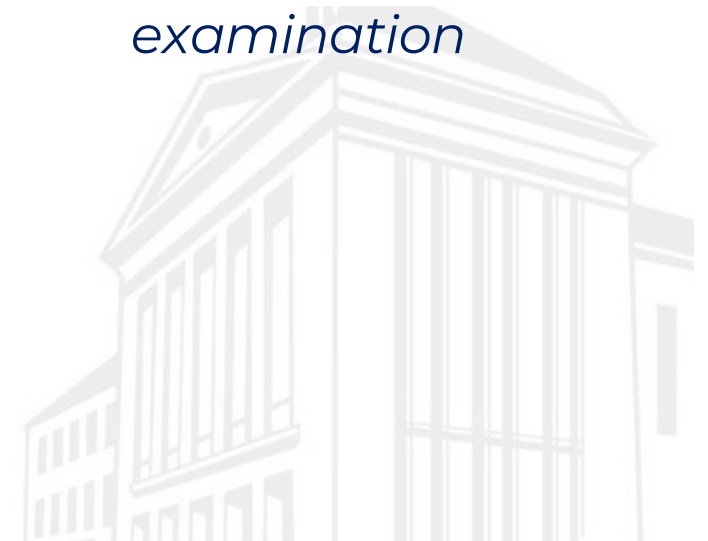
What anatomical axis connects the anterior and posterior part of the body?

- a. the longitudinal axis
- b. the parasternal axis
- c. the sagittal axis
- d. the horizontal axis

Written
test

Distinguish primary bone from secondary bone; Distinguish circumduction from rotation; List and explain the mechanisms that prevent retrograde venous flow

Oral
examination





Background

OSPE I

Points

1	Correctly approaches the preparation of the body for anatomical dissection (takes reusable scalpels and containers, removes coverings, drains fluid, places coverings so that fluid does not drip on the floor)	0	1
2	Holds anatomical tweezers correctly	0	1
3	Holds the scalpel correctly during sharp preparation	0	1
4	Demonstrates correct sharp preparation technique	0	1
5	Holds the scalpel correctly during blunt dissection	0	1
6	Demonstrates correct blunt preparation technique	0	1
7	Correctly shows the boundaries of the topographic region	0	1
8	Correctly names the structures in the topographic region by layers	0	1
9	Correctly describes the topographic relationships of anatomical structures	0	1
10	Demonstrates correct fine preparation technique	0	1
11	Correctly displays anatomical structures in the topographic region	0	1
12	Shows the continuity of structures in the topographic region	0	1
13	Properly disposes of mixed waste	0	1
14	Properly disposes of sharp waste	0	1
15	Properly disposes of biological waste	0	1
16	Properly closes the workplace (wets and covers the body, wipes the floor, disposes of used instruments and containers)	0	1
17	Overall impression: overall dissection skill, professionalism, theoretical knowledge	0	1 2 3 4



Background

Topic 6 – Autonomic innervation

Open-ended questions and sketches

Sketch

1. **Sketch** the sympathetic innervation of the heart and lungs.
2. On the sketch, mark the names of the elements of the sympathetic system (in accordance with the official anatomical nomenclature, Terminologia anatomica).
3. Sketch the pathways by which sympathetic fibers reach their target organs/tissues.
4. Sketch the path by which the sympathetic fibers for the innervation of the sweat glands reach the skin of the dorsum of the foot between the big toe and the second toe.

Topic 9 – Coronary arteries

Theoretical questions

1. Describe which parts of the myocardium and conducting system of the heart are supplied by the right and which by the left coronary artery.
2. **Describe** the concepts of anatomically and functionally terminal arteries using the example of coronary arteries.
3. **Explain** the occurrence of pain in the left shoulder and left arm during myocardial infarction.
4. Assume that the myocardial infarction involved only the lateral wall of the left ventricle. Where would the clot have to be in order for such a clinical presentation to occur and why? What would be the consequences of such an infarction on the cardiac cycle and the conducting system of the heart?



Background

General instruction: OSPE I

- Describe and show the given region on the cadaver.
- **Name** the structures found in the region and describe their location and topography.
- Examine the region on the cadaver, determine which structures are not clearly shown and dissect them.
- Describe the dissected structures and define their topographical relationships.





Background

OSPE I

1	Correctly DESCRIBES the region	0	1
2	Correctly DEMONSTRATES the region	0	1
3	Correctly NAMES the structures	0	1
4	Correctly SHOWS the structures	0	1
5	Correctly DESCRIBES topographic relations of structures	0	1
6	Correctly DEMONSTRATES topographic relations of structures	0	1
7	Correctly defines the structures that need to be dissected	0	1
8	Correctly utilizes instruments during dissection	0	1
9	Applies correct dissection techniques	0	1
10	Correctly demonstrates dissected structures	0	1

		None	25%	50%	75%	90%	100%
0	Overall impression: competency in presentation of region, dissection skill, professionalism, waste disposal	0	1	2	3	4	5



Background

OSPE II

Name and **show** **the structure** through which the middle cranial fossa and the pterygopalatine fossa communicate.

Correctly names anatomical structure 0 1

Correctly shows anatomical structure 0 1





Background

Open-ended questions and sketches

SKETCH

The names of the structures on the sketches must be in accordance with the official anatomical nomenclature, **Terminologia anatomica**.

On each sketch, indicate the appropriate direction (up/down; front/back, medial/lateral, etc.)

SKETCH 1a:

Sketch the **LATERAL VIEW** of the boundaries and content of the neck triangle, **trigonum caroticum**.

- **BOUNDARIES:** On the sketch, mark the names of the structures that form the boundaries of the triangle.
- **CONTENT:** On the sketch, mark the names of the structures in the triangle.

Pay attention to the topographic relationships of the structures!

SKETCH 2g:

Sketch the **FRONTAL** section through the **cavernous sinus**.

- **BOUNDARIES:** On the sketch, mark the names of the structures that form the boundaries of the cavernous sinus.
- **CONTENT:** On the sketch, mark the names of the structures in the sinus and in its wall.

Pay attention to the topographic relationships of the structures!

SKETCH 3a:

Sketch the **TRANSVERSE** section through the **pterygomandibular** potential tissue space.

- **BOUNDARIES:** On the sketch, mark the names of the structures that form the boundaries of this space.
- **COMMUNICATIONS:** On the sketch, mark the direction of the communications with the surrounding potential tissue spaces and indicate the names of these spaces.

Pay attention to the topographic relationships of the pterygomandibular space and its communications!

THEORETICAL QUESTION

QUESTION 17:

Describe how **parasympathetic** fibers reach the **MAJOR salivary glands**.

It is necessary to describe the detailed course of parasympathetic fibers from their origin to **each** of the MAJOR salivary glands. The names of the **nuclei, ganglia, nerves,** and **bony structures** through which the fibers pass must be in accordance with the official anatomical nomenclature, Terminologia anatomica. It is necessary to clearly indicate where the parasympathetic fibers **form synapses**.



Background

- Final exam:
 - Writtentest –
 - Practicaexamination –
 - Oralexamination

What is the terminal branch of the a. tibialis posterior?

Select one:

- A. a. plantaris medialis
- B. a. dorsalis pedis
- C. a. fibularis
- D. a. recurrens tibialis anterior
- E. a. malleolaris anterior lateralis
- F. rr. calcanei

A patient presents with pain in the lower back that spreads to the anterior and lateral side of the leg.

During the examination, the doctor found that the patient had weakened motor functions. The patient **cannot** walk on his heels, but he can stand on his toes.

Which segment of the spinal cord (ie, the roots of which spinal nerve) is most likely injured as a result of a herniated intervertebral disc in this patient?

Select one:

- A. L5
- B. L4
- C. S3
- D. S1
- E. S2





Background

Procedural *knowledge*

Match the description of the structure with the description of the opening in the skull through which the structure passes.

the most medial nerve in the horizontal row of cranial nerves

nerve that innervates maxillary incisors

the most lateral nerve in the horizontal row of cranial nerves

nerve that innervates masticatory muscles

nerve that carries taste fibers from the anterior 2/3 of the tongue

terminal branch of maxillary artery

communication of middle cranial fossa and orbit

communication of pterygopalatine fossa and face

communication of posterior cranial fossa and inner ear

communication of infratemporal fossa and middle cranial fossa

communication of infratemporal fossa and tympanic cavity

communication of pterygopalatine fossa and nasal cavity





Background

A1 – Exam card 1

Practical part of the exam

1. Determine the parity of one bone of the limb. Explain your answer.
2. On the bone, name and show the attachments (origin and insertion) of one muscle of the limb (chosen by the examiner).
3. Identify one typical vertebra (cervical, thoracic or lumbar) and explain your answer.
4. Demonstrate specific movements of selected body parts (movements of the thumb, fingers, the scapula, mandibula, and the shoulder girdle).
5. On the topographic cross-section **1** name and show one structure chosen by the examiner.

Oral part of the exam

1. Compare lining and glandular epithelium and give examples of organs and structures in which these types of epithelia are found. Compare the structure and function of epithelial and connective tissues.
2. Compare the mobility of the hip joint with that of a typical ball and socket joint.
3. Describe the location and boundaries of the axillary fossa and its communications (including the foramen triangulare, foramen quadrangulare and the triceps cleft), content, and topographic relationships. Sketch the axillary openings and the triceps cleft.
4. Compare the continuous and discontinuous joints of the vertebral column, describe their structure and mobility.
5. In a patient, n. fibularis communis has been injured as it passes around the head of the fibula. Correlate the injury with the corresponding sensory and motor defects. Compare this injury with the injury within the sulcus cruris medialis.



Aim

- to determine whether students' success on the continuous assessment correlated with their success on the final exam
- to determine whether certain components of such continuous assessment can be used to predict students' final success





Method

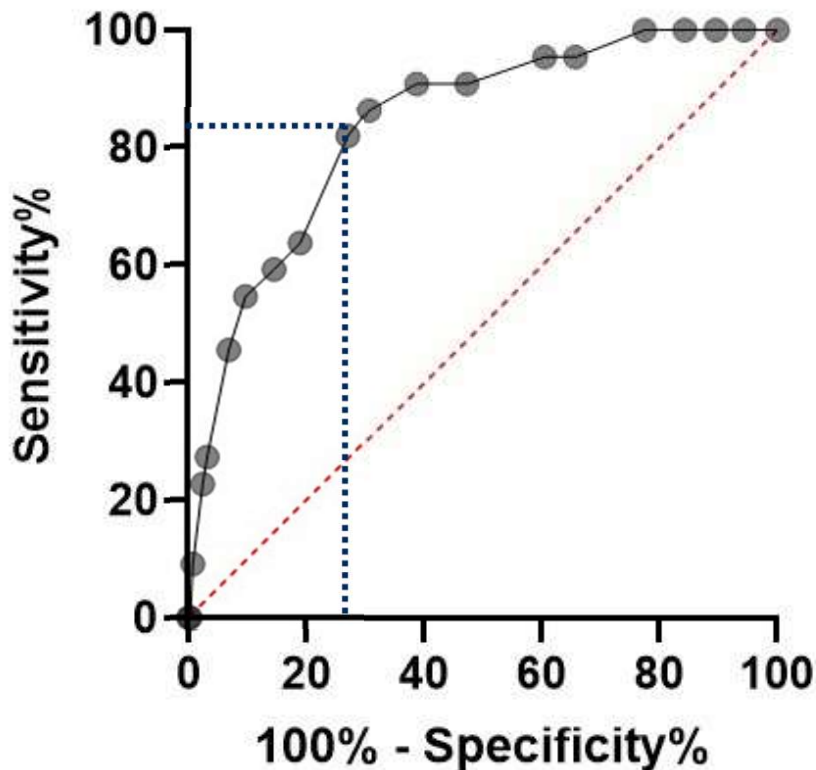
- Spearman's r – correlation between types of continuous assessment and students' final grades
- Receiver operating characteristic (ROC) analysis – how well continuous assessment distinguished between pass and fail



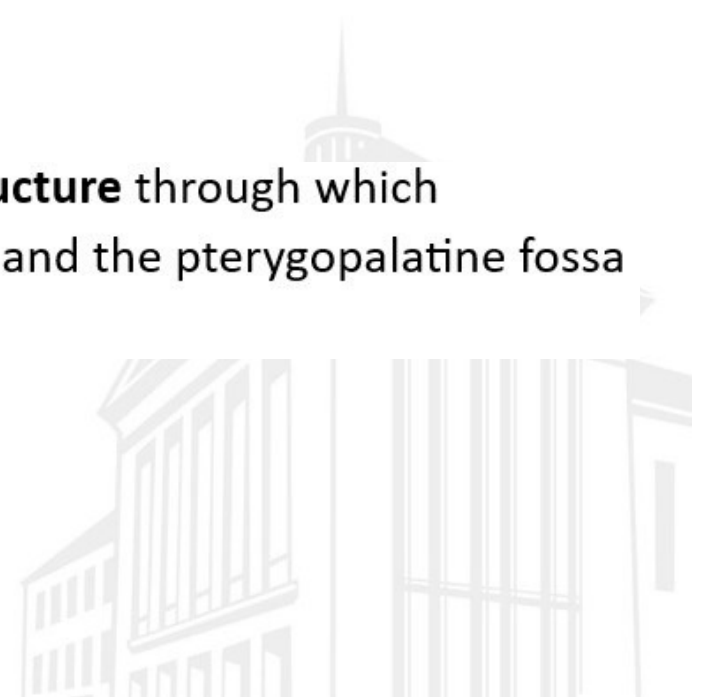


Results

- OSPE II:
 - Most strongly associated with final exam grade ($r = 0.615$) Best
 - distinguished between students who passed and failed the final exam (sensitivity: 82%, specificity: 73%)



Name and show **the structure** through which the middle cranial fossa and the pterygopalatine fossa communicate.





Results

Types of continuous assessment	Association with final grade (Spearman's r)
Written test	0,272
Oral examination	0,578
OSPE I	0,424
Open-ended questions	0,593
OSPE I	0,356
OSPE II Open-ended questions	0,615 0,530





Conclusions

- The more the type of continuous assessments was in line with the assessment at the final exam, the better its predictive value.
- This predictive ability could provide an opportunity for early interventions helping students who are struggling to reach the ILOs.





1.00	0.98	0.27	0.58	0.42	0.59	0.36	0.61	0.53
0.98	1.00	0.27	0.58	0.45	0.63	0.38	0.65	0.56
0.27	0.27	1.00	0.38	0.25	0.30	0.14	0.25	0.27
0.58	0.58	0.38	1.00	0.38	0.44	0.27	0.39	0.36
0.42	0.45	0.25	0.38	1.00	0.35	0.24	0.41	0.31
0.59	0.63	0.30	0.44	0.35	1.00	0.31	0.51	0.50
0.36	0.38	0.14	0.27	0.24	0.31	1.00	0.35	0.27
0.61	0.65	0.25	0.39	0.41	0.51	0.35	1.00	0.51
0.53	0.56	0.27	0.36	0.31	0.50	0.27	0.51	1.00

