Erasmus+

# Development of innovative training solutions in the field of functional evaluation aimed at updating of the curricula of health sciences schools


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MODULE BIOMECHANICS OF SPINE

Didactic Unit D: INSTRUMENTED ANALYSIS OF THE SPINE

D.5. How do I interpret a biomechanics instrumented analysis report in a case of spinal pathology?

## Self-Questionnaire

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AMSE THE ASSOCIATION OF MEDICAL SCHOOLS IN EUROPE

## Self-questionnaire:

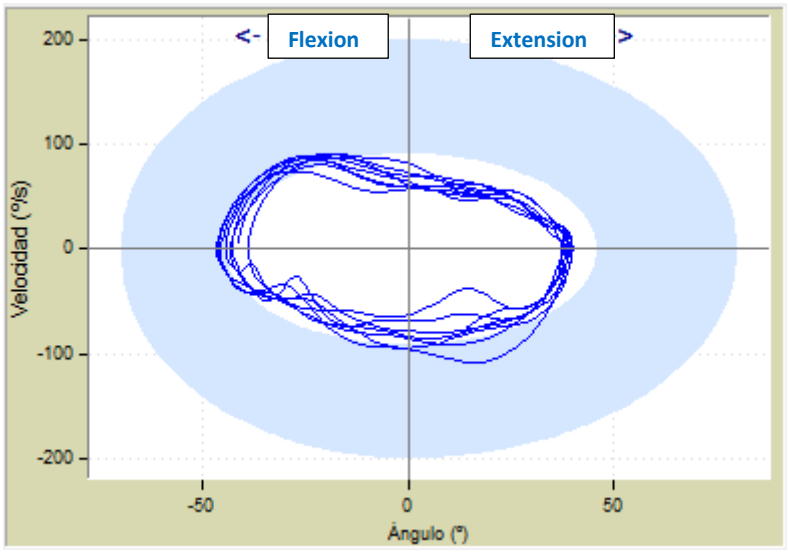
- Self-questionnaire to test the knowledge acquired.
- It will include 5 objective questions with 4 answer options.
- Mark in bold the correct answer.

## Type of questions:

- **Drag and drop into text.** Students select the missing words or phrases and add them to the text by dragging boxes to the correct location. Items may be grouped and used more than once.
- **Drag and drop markers.** Students drop markers onto a selected area on a background image. Unlike the drag and drop onto image question type, there are no predefined areas on the underlying that are visible to the student.
- **Drag and drop onto image.** Students make selections by dragging text, images or both to predefined boxes on a background image. Items may be grouped.
- **Matching.** A list of sub-questions is provided, along with a list of answers. The respondent must “match” the correct answers with each question.
- **Multichoice.** With the multichoice question type you can create single-answer and multiple-answer questions, include pictures, sound or other media in the question and/or answer options and weight individual answers.
- **Select missing words.** Students select a missing word or phrase from a dropdown menu. Items may be grouped and used more than once.
- **True/False.** In response to a question (that may include an image), the respondent selects from two options: True or false.

## Question 1

Select the correct answer regarding the following graphic result:




**1. It was performed using the following MEASURING EQUIPMENT:**

a. Goniometer b. Dynamometer c. **Inertial system** d. Electromyography

**2. The TYPE OF ANALYSIS represented is:**

**a.** Physiological b. Dynamic c. Monitorized d. **Kinematic**

**3. This GRAPH REPRESENTS:**

a. Force versus range of motion.

b. Range of motion versus time.

c. Angular acceleration versus range of motion.

d. **Range of motion versus angular velocity.**

**4. Is the following interpretation of the result correct? (Consider the blue band as the normal reference value):**

**a.** Very fast speed.

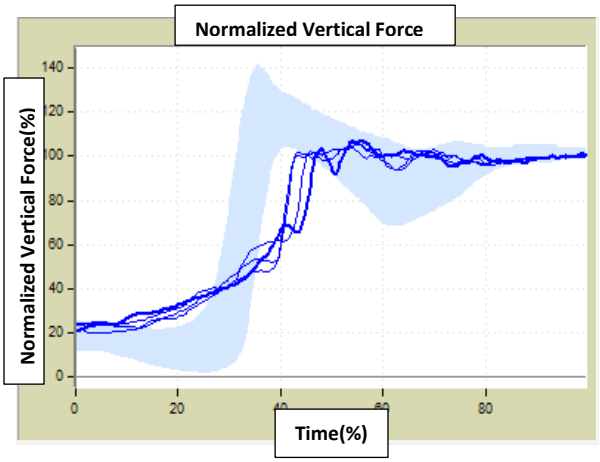
**b. Reduced range of extension of the spine.**

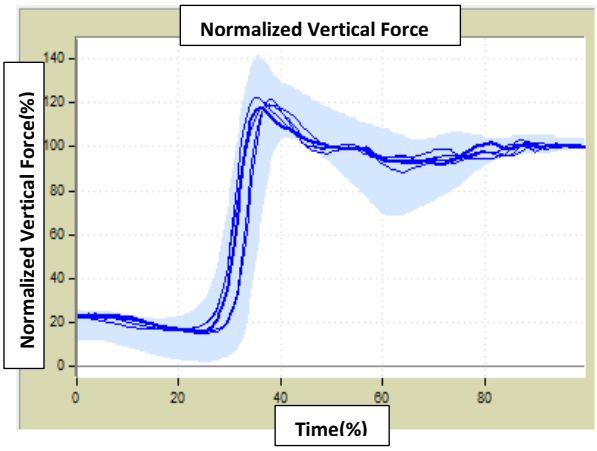
**c.** Decreased accelerations.

d. Flexion is too far from the normal reference values.

## Question 2

Select the paragraph containing the interpretation of the result ~~and drag it next to the corresponding graph:~~




A. The force pattern is repeatable but altered. The slope of the curve is horizontal, with its maximum peak being lower and delayed in time. This means that the momentum generated to stand up is insufficient, which can be associated with pain, strength deficit or lack of coordination.

B. Force pattern of an isometric assessment of the lumbar spine. There is no deficit when comparing the different repetitions.

C. The support force pattern is normal but away from its reference pattern represented by the blue band. This reference pattern corresponds to a pathological movement pattern since its maximum peak is reduced and the slope of the curve is very horizontal.

D. Repeatable and normal force pattern (the blue band represents the normal pattern), which means that the momentum is adequate to perform the movement (good strength and coordination of the trunk and lower limbs).

## Question 3

Select the results that may be altered in the biomechanical analysis of a person with low back pain:

□ A Speed of movement of the spine.

□ B Range of motion of the lumbar spine.

□ C Paravertebral muscle activity.

□ D **All of the above is correct**.

## Question 4

Is this statement correct? An alteration of a biomechanical parameter in a biomechanical assessment of lumbar pathology always indicates a functional alteration of the person being evaluated.

□ A Correct. No further clinical data are required to make a more accurate interpretation of the functional status of the person being assessed.

□ B Correct. It is not required.

□ C **It could be correct, but it depends on the type of parameter that is altered, the degree of the alteration, and the clinical data together with the physical examination of the person being assessed.**

□ D Incorrect

## Question 5

Identify and place in the following table the information provided below. Classify it coherently according to the result that you could obtain in the biomechanical assessment of a person with cervical or lumbar spine pain, and to the instrumental technique that could be used.

| BIOMECHANICAL TEST | POSSIBLE ALTERED RESULT | ASSESSMENT TECHNIQUE |
|---|---|---|
| Flex-relax test | There is no myoelectric silence | Surface electromyography |
| Analysis of an activity: rising from a chair | Photogrammetry | Reduced angular velocity |
| | | |
| | | |

There is no myoelectric silence

Decreased peak force

Flex-relax test

Isokinetic assessment of lumbar strength

Surface electromyography

Alteration of the reaction force pattern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