



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 Gait

Didactic Unit D: Instrumented analysis of gait

D.2 How is a normal biomechanical assessment of gait?

Self-Questionnaire

Question 1

Indicates which alternative is correct with respect to the normality of the spatiotemporal outcomes measured during gait:

- A **The speed ranges between 1.20 and 1.50 m/s in healthy young and adult subjects who walk at a comfortable speed and is influenced by the size of the subjects.**
- B On the spatiotemporal parameters there is no influence of sex or age on the speed.
- C Under normal conditions, people are usually in double support for less than 15% of the gait cycle.
- D During one minute of walking, healthy people who walk at a self-selected speed typically take more than 150 steps per minute.

Question 2

Indicates which alternative is incorrect with respect to the normality of the kinematics outcomes measured during gait:

- A The hip and pelvis have a relevant movement in all three planes of movement.
- B **In the sagittal plane, the ankle joint shows one dorsiflexion and one plantar flexion curve during the stance phase, while the rest of the cycle maintains a neutral position.**
- C The highest angular velocity reached by the knee joint occurs after reaching the second peak of maximum flexion.
- D The range of motion of the pelvis in the transverse plane is approximately 10°.

Question 3

Indicates the correct alternative with respect to the normality of the kinetic parameters measured while walking:

- A The vertical component of the ground reaction force is usually an asymmetric curve, where the first peak of the curve reaches a value of 0.7 force/bodyweight and the second peak reaches a value of 1.2 force/bodyweight.
- B **Under normal conditions, the Y-axis component of the ground reaction force has two peaks, one posterior and one anterior, both of which have a value close to 0.2 force/bodyweight.**

- C The mediolateral component of the ground reaction force, under normal conditions, has a lateral and two medial peaks, whose values are greater than 0.1 force/bodyweight.
- D The speed of the gait has no influence on the morphology of the force curves or the values of normality of ground reaction force components.

Question 4

Indicates the incorrect sentence with respect to the plantar pressures recorded under normal conditions in healthy subjects who walk at a comfortable speed:

- A The maximum plantar pressure peak normally occurs around the second and third metatarsal heads.
- B The maximum peak of plantar pressure registered during walking exceed 200 kPa.
- C In normal situations, the lowest plantar pressure values are observed in the midfoot.
- D **Age has a negative influence on plantar pressure, specially under the rearfoot.**

Question 5

Indicates the correct sentence with respect to the electromyographic pattern recorded during walking in healthy adult subjects:

- A In heel contact, the hip flexors remain activated to garanted the position of the lower limb during stance phase.
- B During midstance the extensor muscles at the hip, knee, and ankle are active to support the weight body.
- C **The knee flexion performed during the swing phase of the gait cycle occurs passively, thanks to the fast acceleration of the thigh.**
- D At the end of the stance phase, the triceps surae is activated at the moment of heel-off.

