Oefentoets klinische bewegingsanalyse

Let op deze vragen zijn gesteld in het Engels omdat ze komen uit een tentamen dat een paar jaar geleden is afgenomen toen deze cursus nog in het Enegels gegeven werd. De toets zal dit jaar uiteraard gewoon in het Nederlands afgenomen worden. Desalniettemin geven onderstaande vragen een goede indruk van het type vragen dat je dit jaar in de multiple choice deel van het tentamen (40 vragen) kunt verwachten. De goede antwoorden staan onder aan het document

A rigid Ankle Foot Orthosis (AFO) enforcing a neutral ankle position , will amplify the "heel rocker action" when heel landing is performed at initial contact and during loading response. This will cause:

a) an increased forward rotation of the tibia , which will yield an increase of knee flexion

b) an increased forward rotation of the tibia , which will incease hamstringsload

c) a decreased forward rotation of the tibia , which will decrease quadriceps load

d) a decreased forward rotation of the tibia , which will will yield an increase of knee flexion

A patient with a transfemoral amputation, who walks with a prosthesis, has no longer the capacity to generate an (internal) knee extension moment. How will he compensate for this during walking ?

a) By walking with a so called "trendelenburg" type of gait (excessive pelvic drop)

b) by shortening the stance phase on his prosthetic leg

c) by hyperextending his prosthetic knee

d) to use circumduction of the prosthetic leg in the swing phase

In case of a dropfoot, toe clearance during swing is compromised.
Which mechanism can NOT be used to compensate for this

a) More extension of the hip

b) Contralateral plantar flexion of the ankle

c) More flexion of the knee

d) Pelvic lift

Which pathology is shown in this figure ?

a) poliomyelitis

b) CVA

c) Cerebral Palsy

d) rheumatoid artritis

Which pathologies of this list are **not** related to a dysfunctioning of the upper motor neuron or basal ganglia?

a) CVA

b) poliomyelitis

c) spastic Cerebral Palsy

d) Dyskinetic or Athetoid Cerebral Palsy

What is meant with "pelvic tilt"?

a) Tilting the pelvis to either the left or the right side

b) A rotation of the pelvis in the sagittal plane.

c) A rotation of the pelvis in the frontal plane.

d) A rotation of the pelvis around the vertical axis.

The so called "foot rockers" during the stance phase of normal walking , involve three separate 'rockers'.
Wat is the correct sequence (in normal walking) ?

a) heel rocker - forefoot rocker - ankle rocker

b) heel rocker - ankle rocker - forefoot rocker

c) ankle rocker - heel rocker - ankle rocker

d) ankle rocker - forefoot rocker - heel rocker

What is the amount of mean external power of a man (mass: 70 kg) who walks on a rigid, flat surface, with constant walking velocity of 1.2 m/s?

a) around -840 Watt

b) around 0 Watt

c) around +700 Watt

d) around +840 Watt

Within one stride, the largest amount of power is generated:

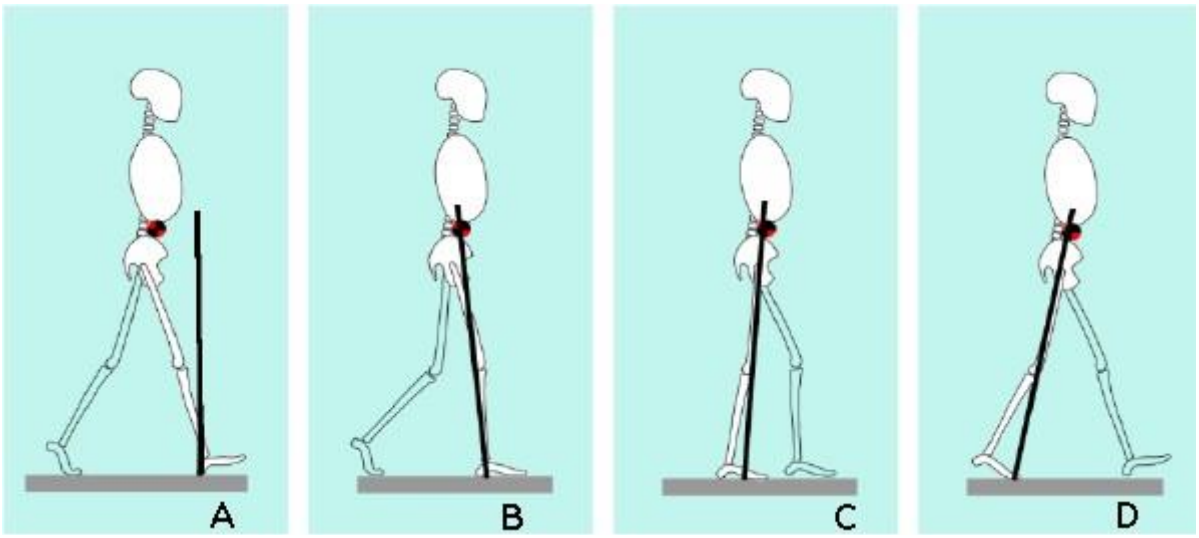
a) About the knee, during "loading response"

b) About the ankle, during "terminal stance" & "preswing"

c) About the hip , during "initial contact"

d) About the knee , during "mid swing"

In this figure the GRF (Ground reaction force) is shown for various phases of gait (normal walking) The direction is OK, but the magnitude is made identical for all phases (which is not the case in reality!)
Which statement is true?



a) The GRF magnitude at "initial contact" (A) is higher than during "midstance" (C)

b) The GRF magnitude at "loading response" (B) is equal to the GRF magnitude during "terminal stance" (D)

c) The GRF magnitude at "midstance" (C) is equal to the GRF magnitude during "terminal stance" (D)

d) The GRF magnitude at "midstance" (C) is higher than during "loading response" (B).

What is the -most important- assumption that justifies the (2D) estimation of a net joint moment by the formula: magnitude(GRF) x distance (GRF-joint axis) , ie. with acceptable errors (less than 10%) ? (GRF=Ground Reaction Force)

a) Just one foot is in contact with the ground (single stance phase)

b) The GRF is perpendicular to the ground

c) The distal acceleration is negligible

d) The body is not moving (ie. standing still)

At "initial contact" in normal walking , the groundreaction force will results in some external moments, which one is correct ? :

a) Ankle dorsal flexion moment

b) hip abduction moment

c) knee flexion moment

d) hip flexion moment

An equation of moments (relative to the centre of mass) can be described as:
M=I*alpha= rd x Fd + rp x Fp + Md + Mp
d = distal ; p = proximal.

When this equation is applied to the thigh (upper leg), which part of the equation describes the net joint moment about the knee ?

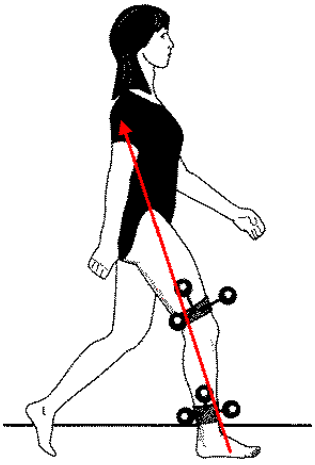
a) rd x Fd

b) rp x Fp

c) Md

d) Mp

The ground reaction force in this figure, results in some external moments about the hip and knee:



a) Knee extension moments and hip extension moment

b) Knee extension moments and no hip moment

c) Knee flexion moment and hip flexion moment

d) No knee moments and hip flexion moment

What is true ?

a) An internal moment is identical to an external moment

b) An internal moment is delivered by muscles, ligaments and bones

c) An internal moment is mainly needed for acceleration

d) An internal moment is larger in swing than in stance

When walking at higher walking velocity, the actual stride time (or: cycle time) shortens. However, also relative to normalised time (0-100%) some changes are seen
What happens when walking velocities increases ?
(KF=KneeFlexion, PF= (anklePlantar Flexion, PSw=PreSwing, LR=LoadingResponse)

a) KF in LR increases, PF in PSw is earlier

b) KF in LR decreases, PF in PSw is earlier

c) KF in LR decreases, PF in PSw is later

d) KF in LR increases, PF in PSw is later

Using a 3D movement analysis , the joint kinematics is represented:

a) By a sequential decomposition of 3 rotations , each in one plane

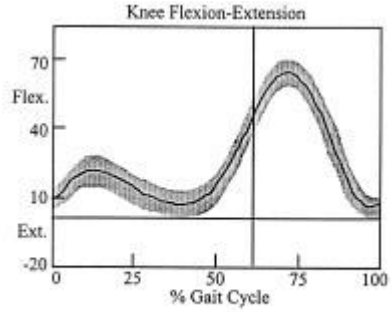
b) By a projection of the solid angle onto the 3 principal (orthogonal) global planes

c) By taking the solid angle representative for the sagittal plane, ignoring out of plane motion

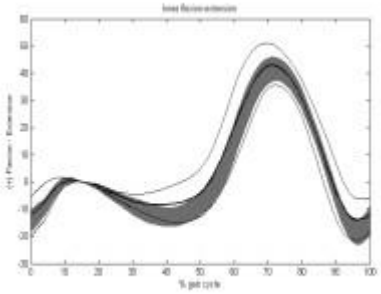
d) Using 3D animations, by means of multimedia visualisations

In this figure, the knee flexion-extension angle of normal walking is shown (A, textbook copy). Part B shows the results of an experiment : the solid bold line represents the mean of a group patients with an ankle-endoprosthesis (thin lines + and - s.d.) The gray area represents the control group that was used.

The most remarkable difference is that in B the knee is in hyperextension during part of the gait cycle. What is the most plausible explanation for this?



A



B

a) The subjects of both the control and ankle arthrodesis group , expose both knee hyperextension

b) Figure B the knee flexion/extension angle includes the other planes as well , and is therefore artificially greater

c) Figure A represents a two dimensional ' closed angle definition' , which means that the angle cannot become less than zero degrees, i.e always greater than 0° .

d) The axes of thigh and shank were not well aligned, during calibration, which means that full extension is not well recorded, and actual normal extension results in hyperextension.

What is not true in human movement analysis , when optoelectronic 3D is compared to video based 2D ?

a) 3D is more accurate in the transversal plane

b) 3D requires more expensive equipment and elaborative procedures

c) 3D kinematics are not sensitive to projection errors

d) 3D kinematics are more straightforward to interpret

In a normal gait cycle the ratio between the duration of stance phase and swing phase is approximately:

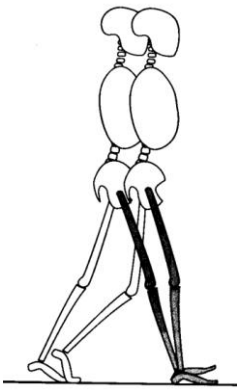
a) 40% - 60%

b) 80% - 20%

c) 50% - 50%

d) 60% - 40%

Which phase of the gait cycle (according to the subdivision of Perry) is displayed in this figure? (base your answer on the position of the dark leg)



a) initial contact

b) loading response

c) terminal stance

d) preswing

The so-called "foot rockers" during the stance phase of a gait cycle contain three independent rockers. What is the correct order of occurence of these rockers?

a) heel rocker - forefoot rocker - ankle rocker

b) heel rocker - ankle rocker - forefoot rocker

c) ankle rocker - heel rocker - forefoot rocker

d) ankle rocker - forefoot rocker - heel rocker

Preferred stride length and stride time at a given walking speed depend on leg length of a person. What is the effect of increasing leg length on these parameters?

a) stride length increases and stride time increases

b) stride length decreases and stride time increases

c) stride length increases and stride time decreases

d) stride length decreases and stride time decreases

Which of the muscles below does **NOT** contribute to an anteflexion moment around the hip joint?

a) adductor magnus

b) gracilis

c) semimembranosis

d) pectineus

During terminal swing, when extension of the knee occurs together with anteflexion of the hip, the following muscle contraction will most likely occur.

a) eccentric contraction of m. semitendinosus

b) concentric contraction of m. semitendinosus

c) eccentric contraction of m. rectus femoris

d) isometric contraction of m. rectus femoris

'Upward Obliquity' is a description for..

a) the upward movement of the posterior side of the pelvis around a sagittal axis

b) the upward movement of the anterior side of the pelvis around a sagittal axis

c) the upward movement of the pelvis at the side of the stance leg around a frontal axis

d) the upward movement of the pelvis at the side of the swing leg around a frontal axis

a)

EMG can be used to assess muscle contribution during gait but which characteristic of this muscle contribution is most difficult to assess.

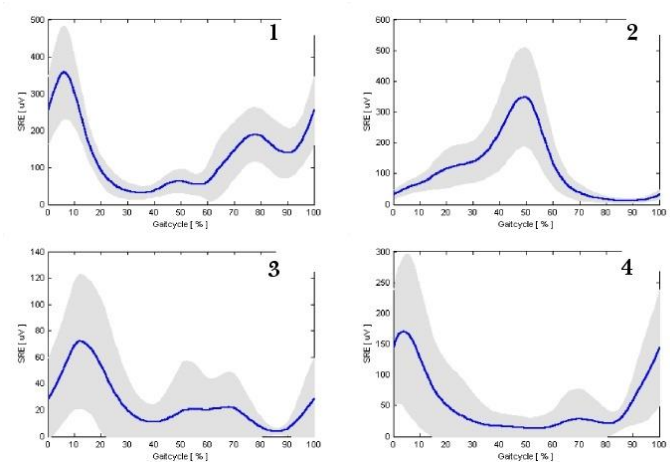
a) the magnitude of muscle activation

b) the magnitude of muscle force

c) the timing of muscle activation

d) co-activation between muscles

In the figure below you see muscle activity of 4 different leg muscles during gait. Which figure most likely displays the activity of the m. tibialis anterior.



a) 1

b) 2

c) 3

d) 4

which function will (most likely) **NOT** be fullfilled by the hip flexors during normal gait at normal to high speed?

a) hip anteflexion in preswing

b) knee flexion in preswing and initial swing

c) foot clearance in midswing

d) hip anteflexion in terminal swing

When during quantitative 3D gait analysis an anteflexion net joint moment is found around the hip in midswing without the presence of EMG activity in the m. rectus femoris, this lack of rectus femoris activity (which you might expect) could most likely be attributed to:

a) contribution of passive structures around the hip joint to the anteflexion moment

b) contribution of synergistic muscles to the anteflexion moment

c) confounding effect of the muscles' force-velocity relation on the amplitude of the EMG signal.

d) the electromechanical delay between EMG and muscle force (and net joint moment)

Walking in crouch gait predominantly increases the energy requirement due to:

a) the increased energy cost for swinging the leg

b) the increased energy cost for centre of mass displacement

c) the increased energy cost for step-to-step transitions

d) the increased energy cost for generating (isometric) muscle force

Which of the factors below does NOT belong to the "six determinants of gait" (Saunders et al. 1953)?

a) pelvic rotation during double support

b) knee extension in stance

c) pelvic obliquity in stance

d) foot rockers

Which of the statements below with respect to the energy requirement of gait is TRUE?

a) energy consumption (J/kg/min) increases in a quadratic way with gait speed.

b) energy consumption (J/kg/min) increases in a linear way with cadence.

c) energy cost (J/kg/m) is constant over all gait speeds.

d) energy cost (J/kg/m) is constant over all stride lengths.

The six determinants of gait (introduced by Saunders et al. 1953) were supposed to reduce the metabolic energy required for:

a) The step-to-step transition

b) swinging the leg during swing

c) deviating from an inverted pendulum

d) displacement of the body's centre of mass

Which of the factors below has, up to now, been shown to have little contribution to the restoration of walking ability after stroke?

a) restoration of muscle coordination

b) treadmill training

c) compensation through orthotic devices or walking aids

d) soft tissue surgery

Which type of surgery could be indicated for a child with cerebral palsy that walks with adduction and endorotation of the hip in terminal swing to loading response.

a) Psoas release

b) Medial Hamstring release

c) Rectus Femoris transfer

d) triple arthrodesis

Becher presented the Amsterdam classification for gait patterns of CP children. Which gait type describes a CP child that walks with flexed knees and full foot contact in midstance?

a) type 2

b) type 3

c) type 4

d) type 5

Which leg will a person with a transfemoral (above the knee) prosthesis select as a leading leg to climb the stairs, and which leg will be used as leading leg when descending the stairs. (leading leg is the leg which is placed first on the separate steps of the stairs)

a) The prosthetic leg is leading during both climbing and descending the stairs.

b) The intact (healthy) leg is leading during both climbing and descending the stairs.

c) The prosthetic leg is the leading leg when climbing the stairs and the intact leg is leading when descending the stairs.

d) The intact leg is the leading leg when climbing the stairs and the prosthetic leg is leading when descending the stairs.

Goede antwoorden

A	A
C	C
A	A
B	C
B	B
B	A
B	D
B	B
B	D
B	B
C	A
D	D
C	A
C	B
B	D
A	D
A	
D	
D	
D	
B	
B	