

GAIT ANALYSIS PPT NOTES

GAIT ANALYSIS
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LINK ADVANCED MOVEMENT MECHANICS

OBJECTIVE

- Discuss normal gait patterns and common biomechanical dysfunctions
- Discuss programming options for gross motor movements and sport skills based on movement mechanics
- Be theoretical and practical—qualitatively analyze human subjects and case studies
- Discuss how this will change your instructing/training

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WHY STUDY GAIT?

- It is an easy screen to figure out the puzzle
- Affects your training decisions and exercise/movement choices
- Poor positioning over time with load can cause injury and decrease performance
- Why we use it (as a general sweep to find anatomical dysfunction or abnormalities first, to give clues about where to look more specifically)

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NORMAL GAIT

- Individualistic
- Can reflect emotional state, sport training, occupation or injury
- Alternating movements of lower extremities, carry and support the upper body—approximately 75% of body weight
- In standing posture upper body supported by both legs, while gait requires weight to be supported and transferred to single-leg stance

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WHAT GAIT IS

- Linear translation of the body through repeated rotational movements in order to move the body from one point to another
- What is normal gait?
- No standardized gait analysis, no universal agreement on mechanics

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HOW IS GAIT ANALYSIS RELEVANT TO CLIENT PROGRAMMING?

LINK clients are either people with painful, chronic injuries or high-performance athletes

- Relevancy is different between the two groups.
- Injured population—gait analysis provides information about where they have abnormal movement compensations that could be feeding into their pain.
- Athletic population—allows assessment of level of fatigue (both globally and locally)
- Discover any acute injuries that they might not even be aware of
- Find biomechanical inefficiencies that could be hindering performance

Global sweep to find large abnormalities

Qualitative tool, not diagnostic



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GAIT

Analyze gait in lower kinematics

- Upper body: contralateral hip and shoulder/thorax matching
- Stance (heel strike, foot flat, midstance, heel off, toe off)
- Joint position, planes of motion and muscles used in each stance phase
- Swing (acceleration, mid-swing, deceleration)
- Joint position, planes of motion and muscles used in each stance phase
- Observed from front/back/side



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COMPENSATORY MOVEMENTS OFTEN SEEN IN GAIT

Common variances

- Issue
- Potential cause
- How it comes out in performance
- Solution

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TRENDELENBURG GAIT

What's wrong? What could cause it?


- Frontal plane control
- Dysfunction in abductors/adductors of hip + ankle
- Knee rotation

What dysfunction could it create?

- SI joint issues
- Knee pain

How do you address it? + Exercise ideas

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ANTALGIC GAIT

What's wrong? What could cause it?


- Frontal plane control
- Sagittal eccentric control
- Lack of local stability
- Lateral line issues
- Dysfunction in abductors/adductors of hip + ankle

What dysfunction could it create?

- SI joint issues
- Knee pain
- Overactive global muscles
- Lack of sagittal control
- OA hip/low back
- Inability to cross pattern

How do you address it? + Exercise ideas

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PEG LEG WALK

What's wrong? What could cause it?

- Overpulling COG forward over base of support
- Sagittal plane control at hip
- Poor eccentric loading of knee/ankle
- Dysfunctional posterior chain and hip flexors
- Dysfunctional eccentric loading of quadriceps
- Lack of stability in ankle
- Dysfunctional oblique control

What dysfunction could it create?

- SI joint issues
- Labral tears/FAI issues
- Groin pain

How do you address it? + Exercise ideas



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VALGUS/VARUS

Can't change structural issues with exercise. Can only manage.

- Genu Varus—Externally rotated femur, internally rotated tibia, supinated feet. Extreme cases lead to hamstring/adductor tears and damage.
- Genu Valgus—Internally rotated femur, externally rotated tibia, pronated feet. Extreme cases lead to back issues, medial knee damage, foot issues, hip impingement.

How do you address it?

- Mechanical or structural

Exercise ideas



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LACK OF ECCENTRIC LANDING

What's wrong? What could cause it?

- Poor absorption through ankle and knee
- Lack of global stability/eccentric control

What dysfunction could it create?

- Knee pain
- Ankle/foot issues
- Hip impingement
- SI joint issues
- Back pain

Exercise ideas



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GENERAL PROGRAMMING

Things to ponder

- Foot—mobility/stability
- Knee—mobility/stability
- Hip—mobility/stability
- Trunk—mobility/stability

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INTEGRATE

The entire kinematic chain

- Work from the axial skeleton to get to the feet
- Work from the feet to get to the trunk
- Mechanics of pelvis on femurs and femurs on pelvis
- Closed and open kinematic chains

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QUESTIONS?

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