ROTATIONAL & OSCILLATORY FACTORS IN LOCOMOTIVE MECHANICS

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Oscillations

Oscillation

- Repetitive Movements
- Energy Input / Output Ratio
- Frequency Dependence

Classifying Oscillatory Movements

- External Oscillations
- Internal Oscillations
  - Distal Oscillations
  - Proximal Oscillations
  - Countering Oscillations
External Oscillations

Sinusoidal Path of the Center of Mass
- Elastic Loading & Energy
- Displacement Enhancement
- Creating a Vertical Oscillatory Environment

Horizontal Force Production Prerequisites
- The Drive Phase
- Inherent Horizontal Generation

Breakdowns in the Wave
- Force Production Decrements
- Instability and Grounding Reflexes

Sport Specific Applications and Issues
- Sprints
- Hurdles
- Jumps
- Throws
External Oscillations

Rotational/Translational Models

Progression/Regression Models
Distal Oscillations

Amplitude of Motion
- High Amplitude and Efficiency
- Prices of Diminished Amplitude

The Elastic Pendulum Model
- Elastic Energy Generation
- Complicating Factors – Transferring Angular Momentum

Tuning the Pendulum
- Mechanics and Tools
- Effectiveness & Cost

Countering Oscillations
- Direction
- Magnitude & Radius

Specific Applications
- Sprints
- Hurdles
- Jumps
- Throws
Proximal Oscillations

Pelvic Oscillations
  • Elastic Energy
  • The Spinal Engine Theory
  • Pelvic Origination
  • Planes

Countering Oscillations
Transverse Oscillations

- Rotational Musculature
- Lateral – Rotational Movement Relationships
- Training Rotation
- Countering Oscillations
Frontal Oscillations

- Oscillatory Musculature
- Countering Oscillations
Pelvic Oscillations

- The Figure 8 Oscillatory Pattern
- Degradation
  - Instability
  - The Flexion Reflex
- Applied Considerations
  - Pelvic Origination & Hip Flexion
  - Stride Length and Displacement Issues
  - Rotational Countering – Necessity and Magnitude
  - Amplifying & Symmetry of Oscillation in Hurdling
  - Pelvic Oscillations and Steering
  - Countering Oscillations and Separation in the Throws