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# SNS COLLEGE OF PHYSIOTHERAPY COIMBATORE - 641035

COURSE NAME: BASICS PHYSICS

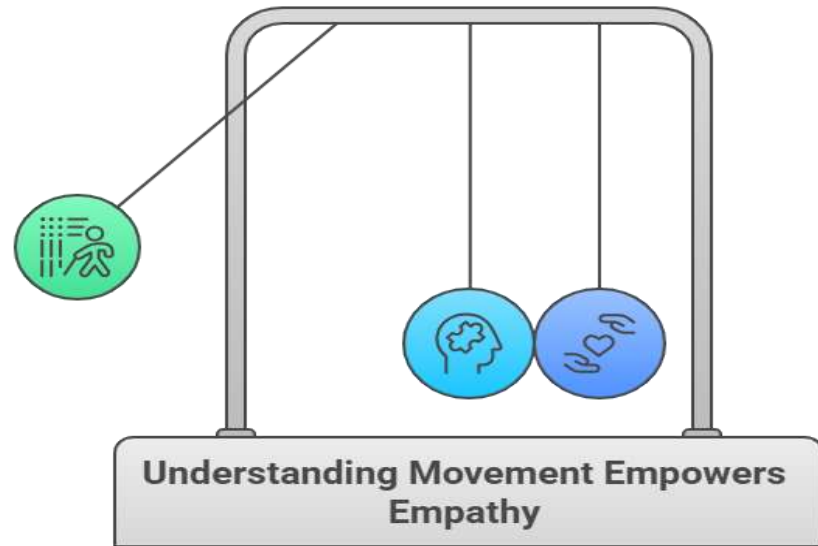
TOPIC: MECHANICS AND BIOMECHANICS

SUBJECT CODE: 746283

# Empathize

Understand how patients move and interact with gravity and resistance.

Observe postural problems and mobility limitations in real-life contexts.



## Movement Analysis

Observing patient interactions

## Deeper Comprehension

Understanding patient experiences

## Effective Support

Providing better patient care

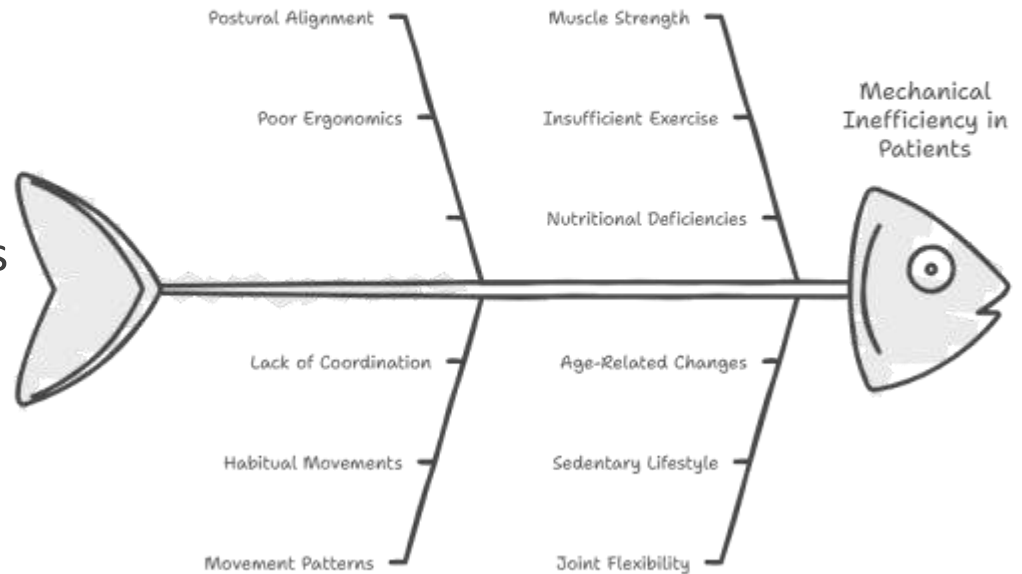
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# Define

Problem: Patients show mechanical inefficiency in movement or posture.

Goal: Identify principles of mechanics and biomechanics that influence motion.

## Analyzing Mechanical Inefficiency in Patients



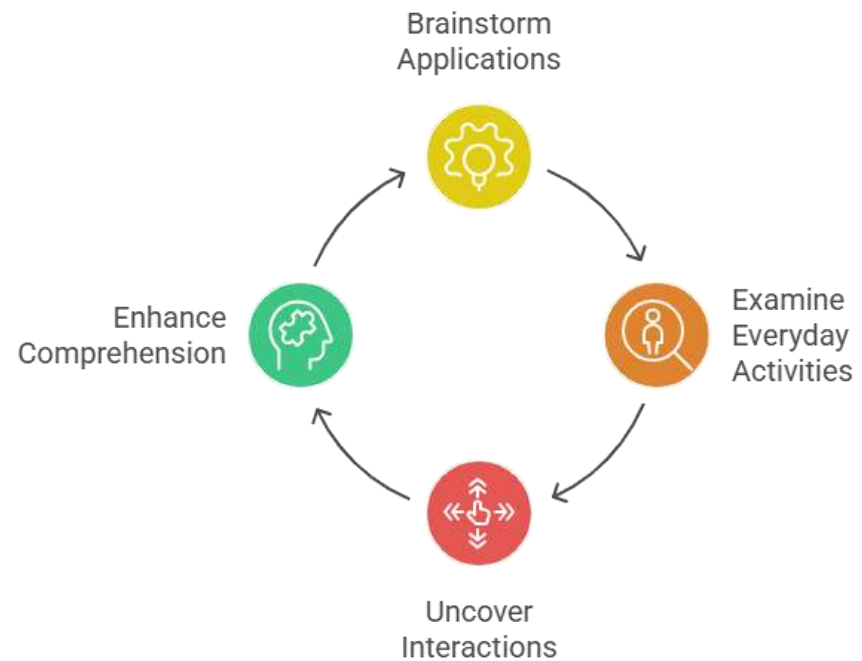
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# Ideate

Brainstorm how physics and mechanical laws apply to the human body.

Discuss real-world examples – walking, lifting, sitting, and balance.

## Cycle of Biomechanical Understanding

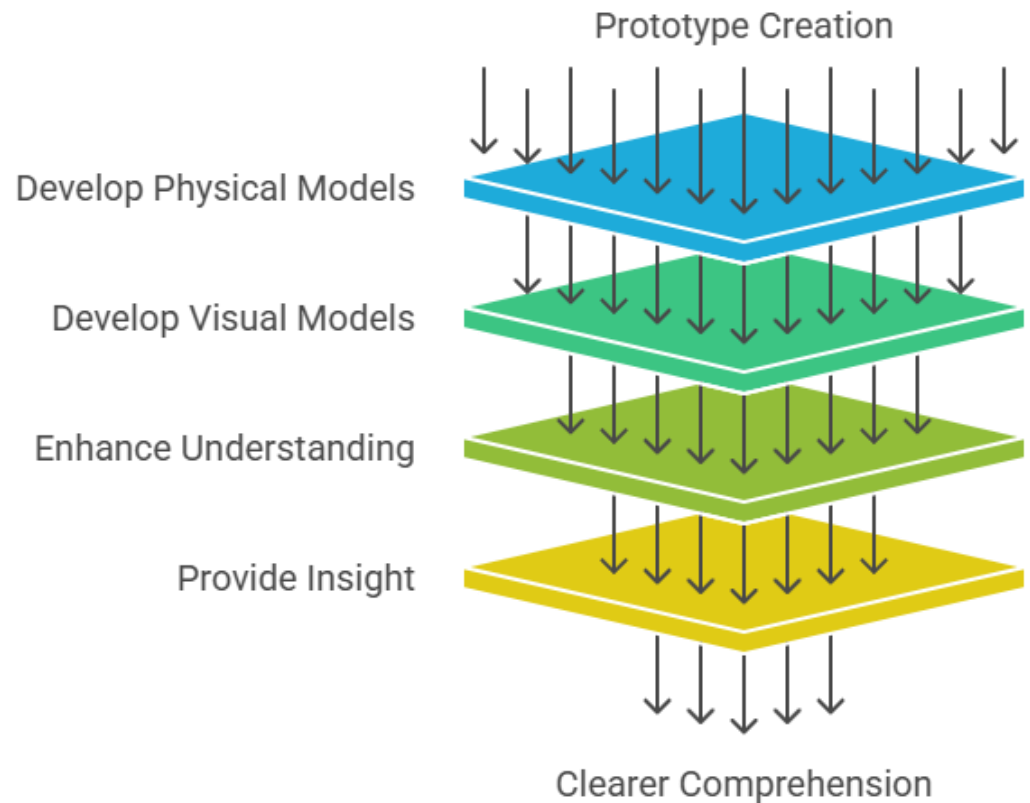


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# Prototype

## Enhancing Biomechanical Understanding

Develop physical and visual models (e.g., lever systems, torque demos) to show biomechanical movement.

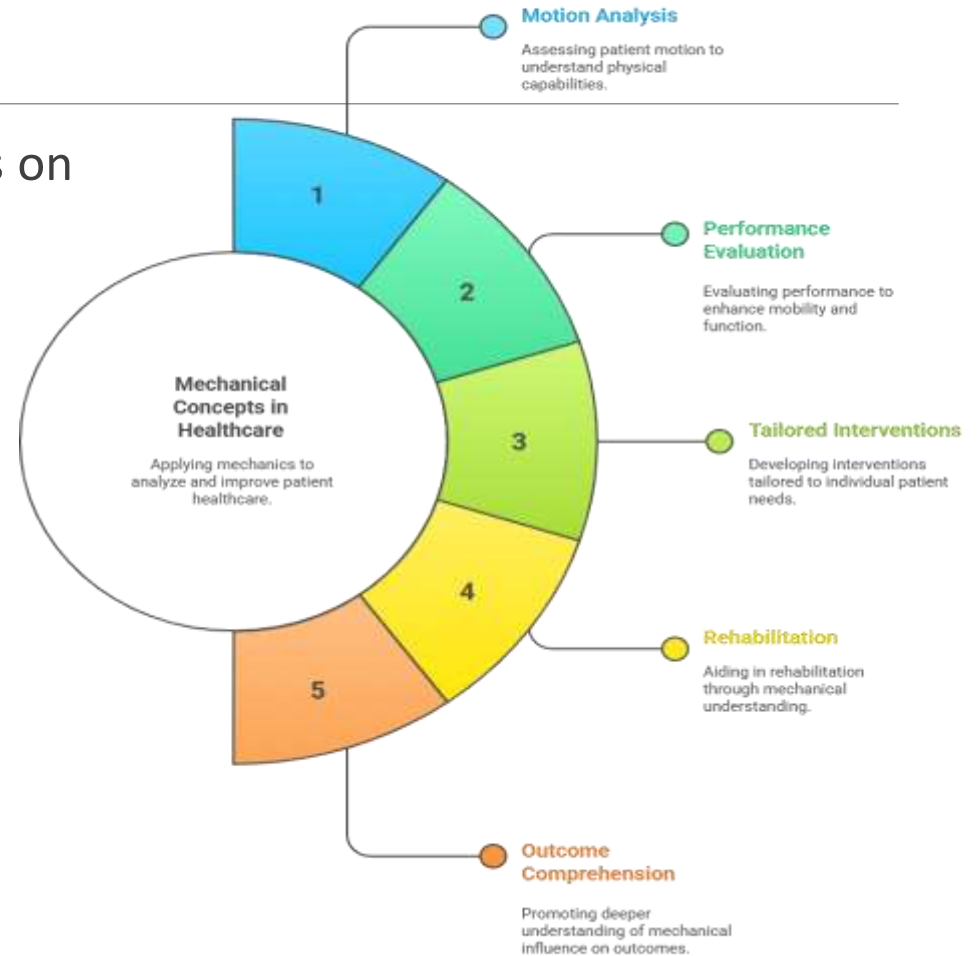


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# Test

Apply the mechanical concepts on patients – analyze motion and evaluate performance improvement.

## Unveiling Mechanical Concepts in Healthcare



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# Introduction to Mechanics

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Mechanics = Study of motion and forces.

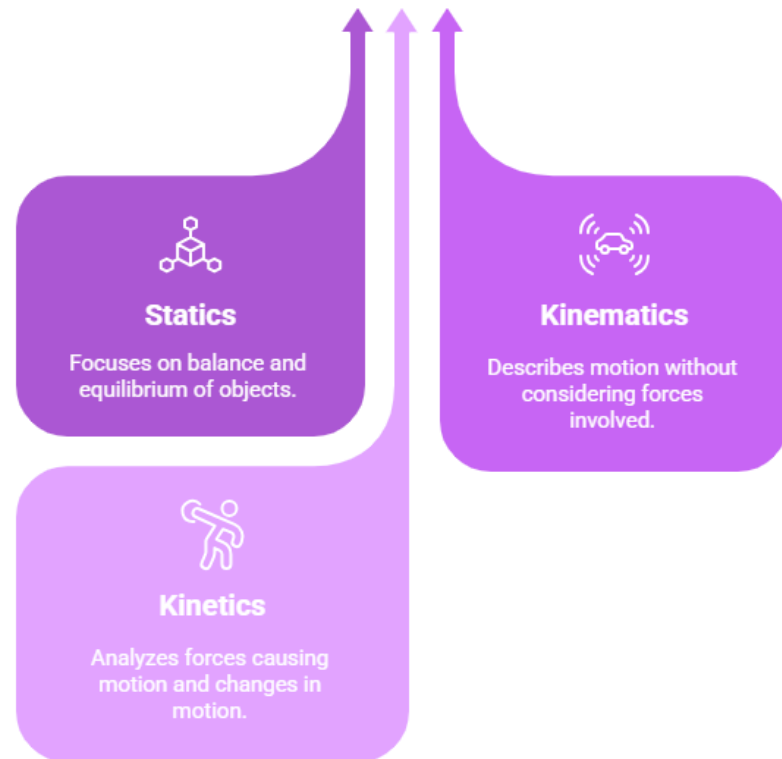
Two main divisions:

1. Statics – study of bodies at rest
2. Dynamics – study of bodies in motion

# Branches of Mechanics

1. Statics – balance and equilibrium
2. Kinematics – motion description (speed, velocity, acceleration)
3. Kinetics – study of forces producing motion

## The Mechanical Trio



# What is Biomechanics?

Application of mechanical principles to biological systems.

Helps in understanding how forces act on the human body.

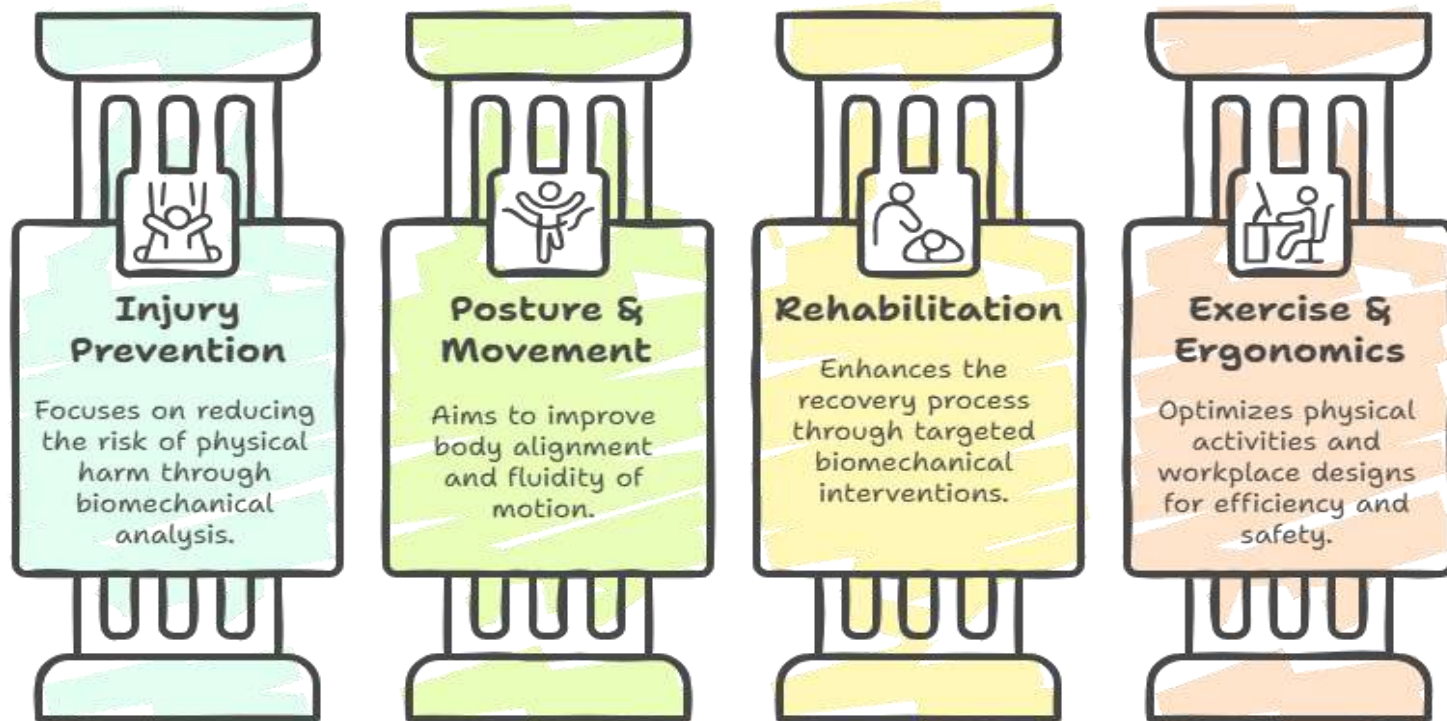
## Biomechanics Applications

Application	Description
<b>Movement</b>	Understand how forces affect motion
<b>Injury Prevention</b>	Analyze interactions to avoid harm
<b>Rehabilitation</b>	Provide insights for physical recovery
<b>Performance Enhancement</b>	Improve physical capabilities through analysis
<b>Health</b>	Enhance understanding of physical well-being

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# Importance of Biomechanics

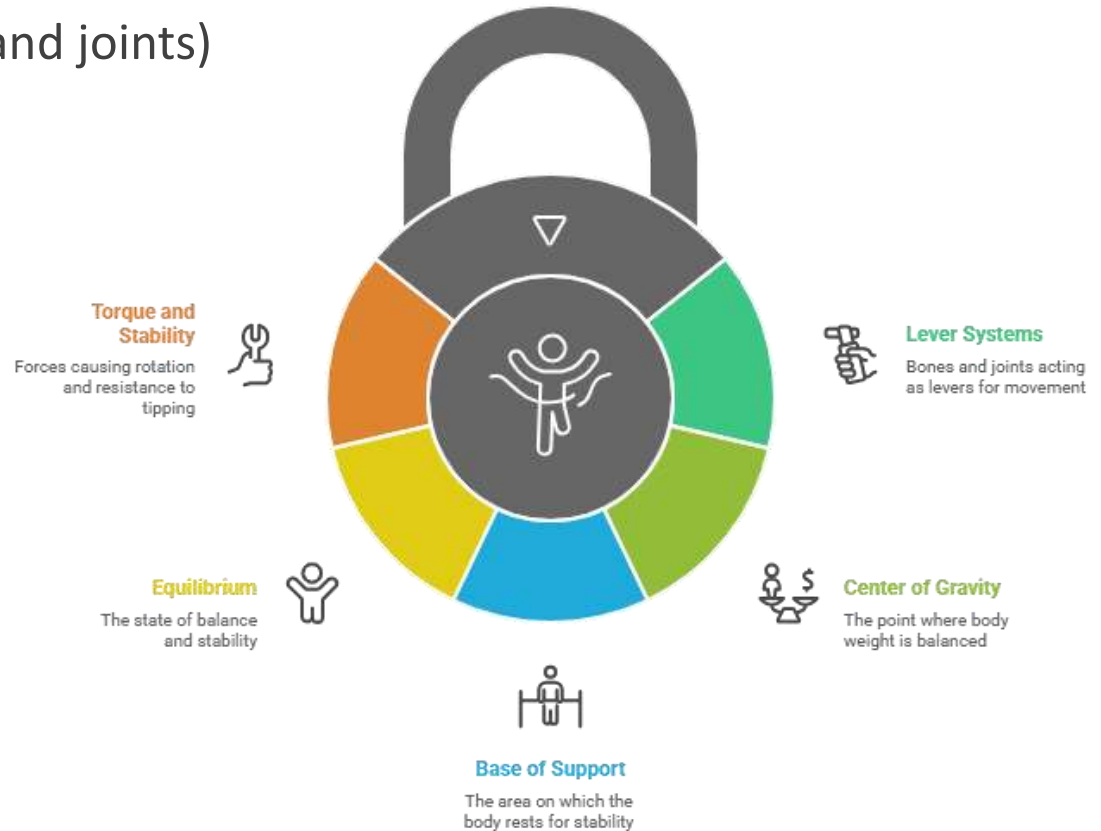
## Foundations of Biomechanics



# Mechanical Principles in Human Body

## Foundations of Human Movement

1. Lever systems (bones and joints)
2. Center of gravity
3. Base of support
4. Equilibrium
5. Torque and stability



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# Static & Dynamic Concepts

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- Static: maintaining balance in standing
- Dynamic: movement during walking or lifting

**Which concept is more relevant for understanding physical activities?**



**Static**

Maintaining balance and stability



**Dynamic**

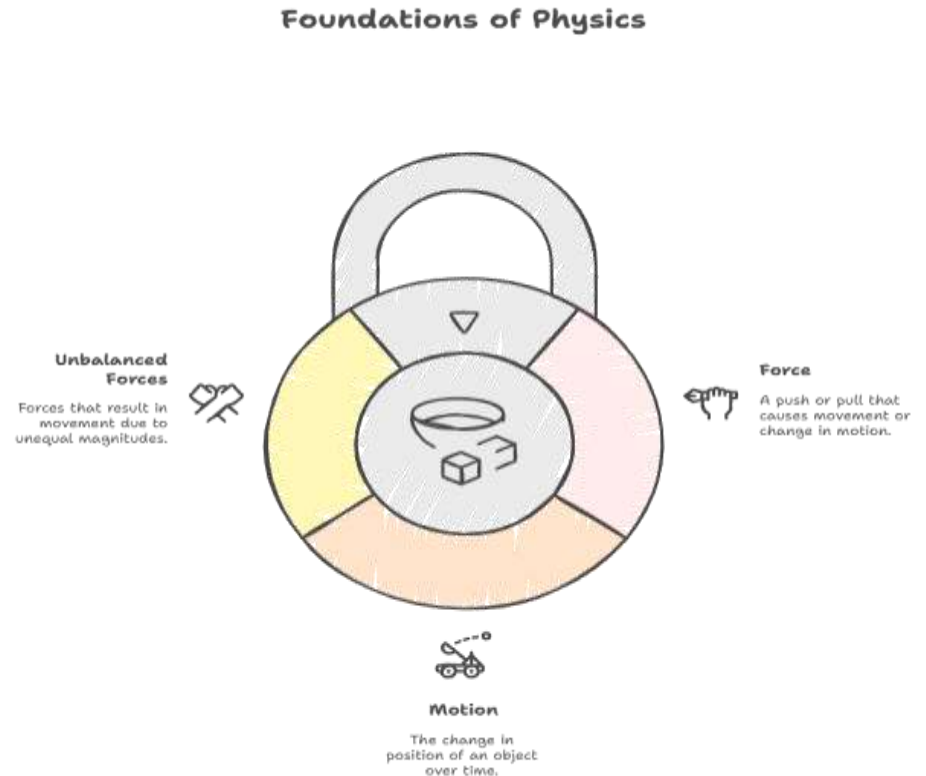
Engaging in movement and coordination

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# Force and Motion

Force = Push or Pull  
→ causes  
movement or  
change in motion.

Motion occurs when  
forces are  
unbalanced.



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# Clinical Relevance

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- Biomechanics guides physiotherapy treatment planning.
- Improves gait analysis, posture correction, and strengthening protocols.

# Summary

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Mechanics + Biology = Biomechanics

Focus on: Force, motion, balance, stability.

Foundation for understanding human movement.

# Learning Outcomes

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After this lesson, students should be able to:

1. Explain mechanics and biomechanics.
2. Differentiate statics, dynamics, and kinetics.
3. Apply mechanical laws to human movement.

# Class Questions

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1. Define mechanics and biomechanics.
2. Differentiate between statics and dynamics.
3. Explain the role of biomechanics in physiotherapy practice.
4. Mention any two branches of mechanics with examples.

# Case Scenario / Critical Thinking

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A patient has poor posture and back pain during prolonged standing.

- Identify mechanical issues involved.
- Which biomechanical principles apply?
- Suggest one movement correction technique.