SNS COLLEGE OF PHYSIOTHERAPY COIMBATORE - 641035

COURSE NAME: BASICS PHYSICS

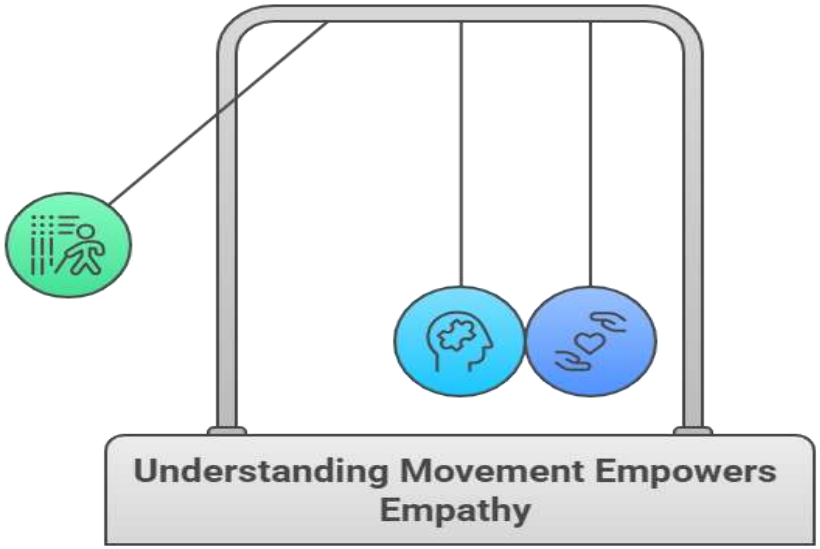
TOPIC: MECHANICS AND BIOMECHANICS

SUBJECT CODE: 746283

Empathize

Understand how patients move and interact with gravity and resistance.

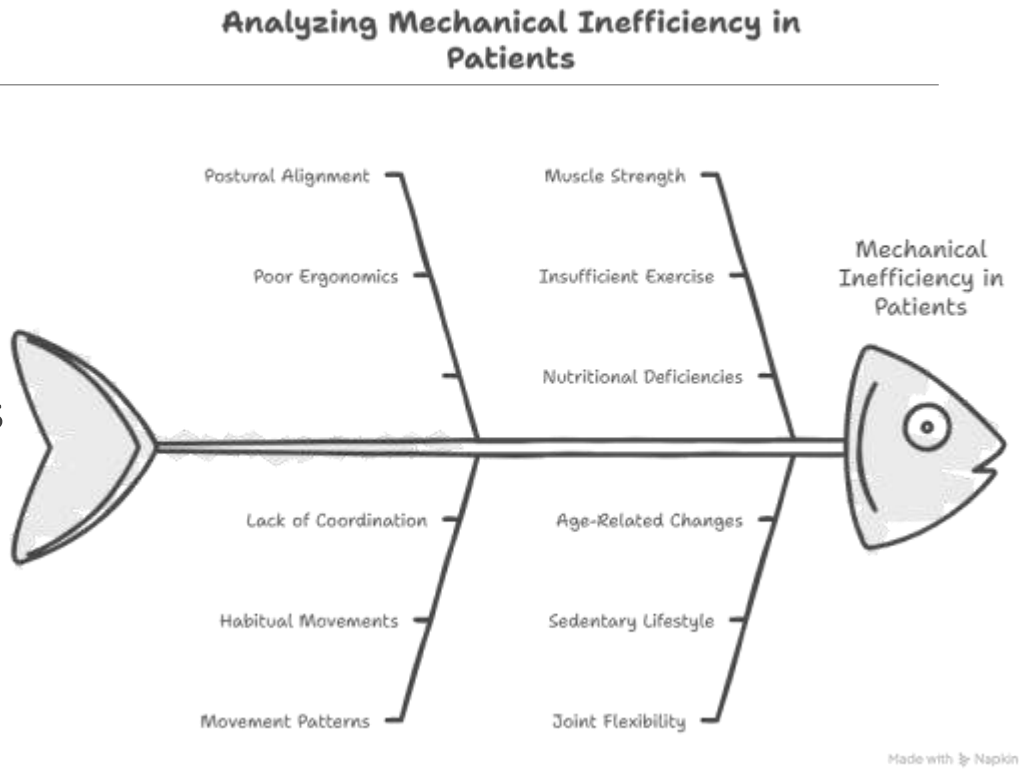
Observe postural problems and mobility limitations in real-life contexts.



Define

Problem: Patients show mechanical inefficiency in movement or posture.

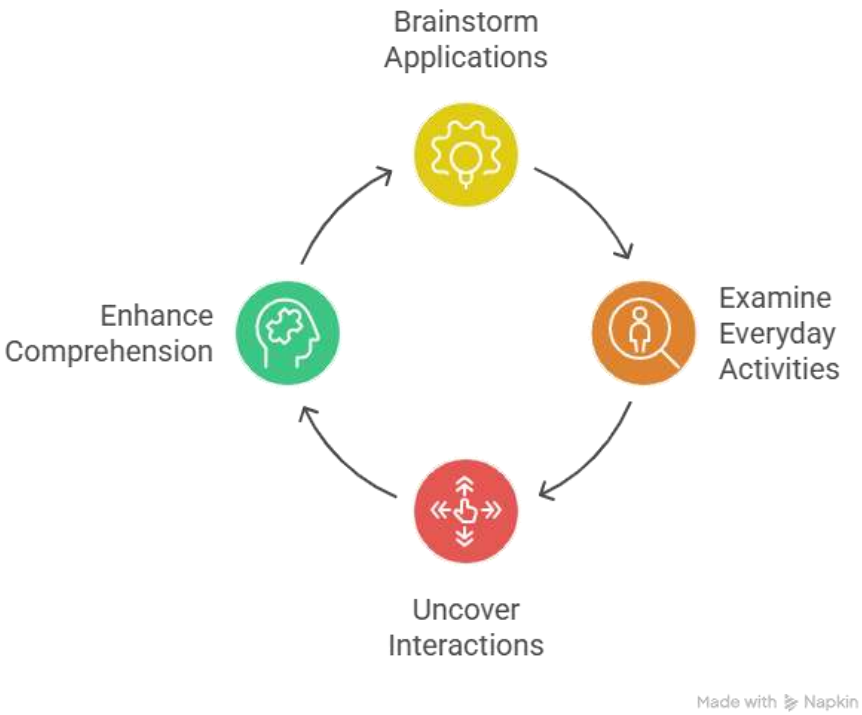
Goal: Identify principles of mechanics and biomechanics that influence motion.



Ideate

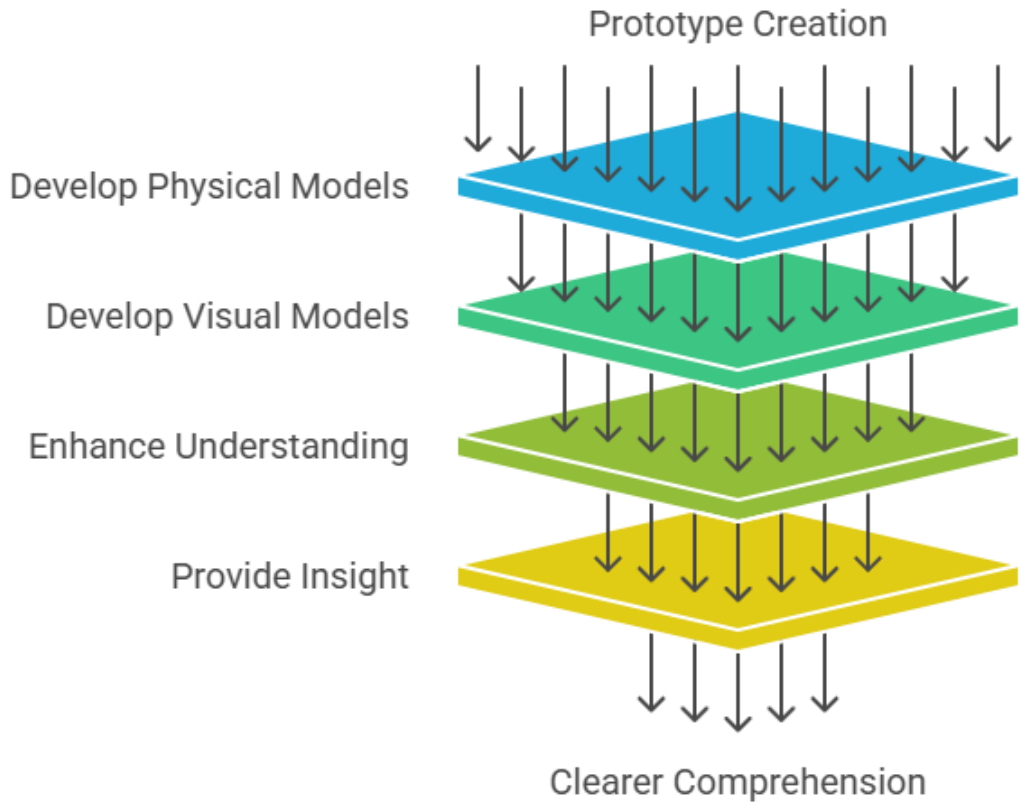
Brainstorm how physics and mechanical laws apply to the human body.

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



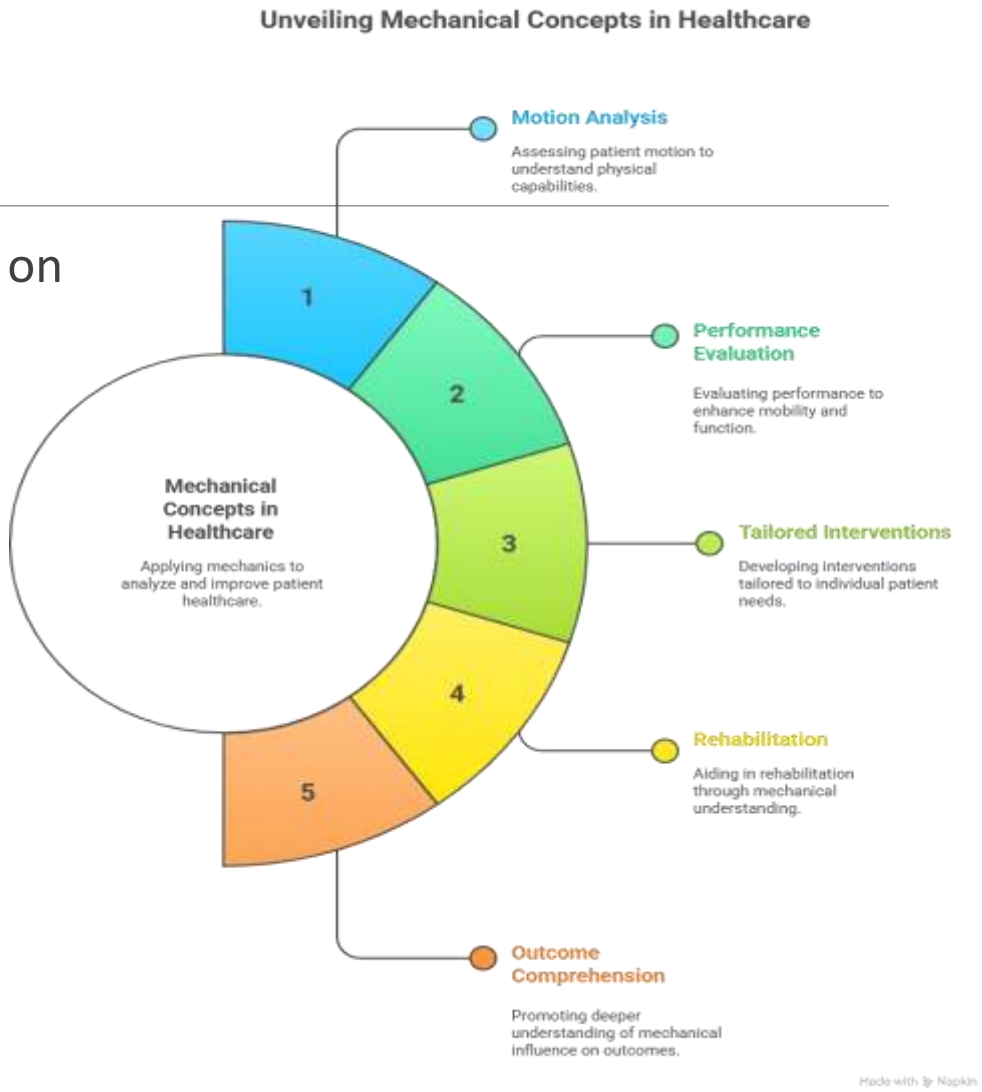
Prototype

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



Test

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



Introduction to Mechanics

Mechanics = Study of motion and forces.

Two main divisions:

1. Statics – study of bodies at rest

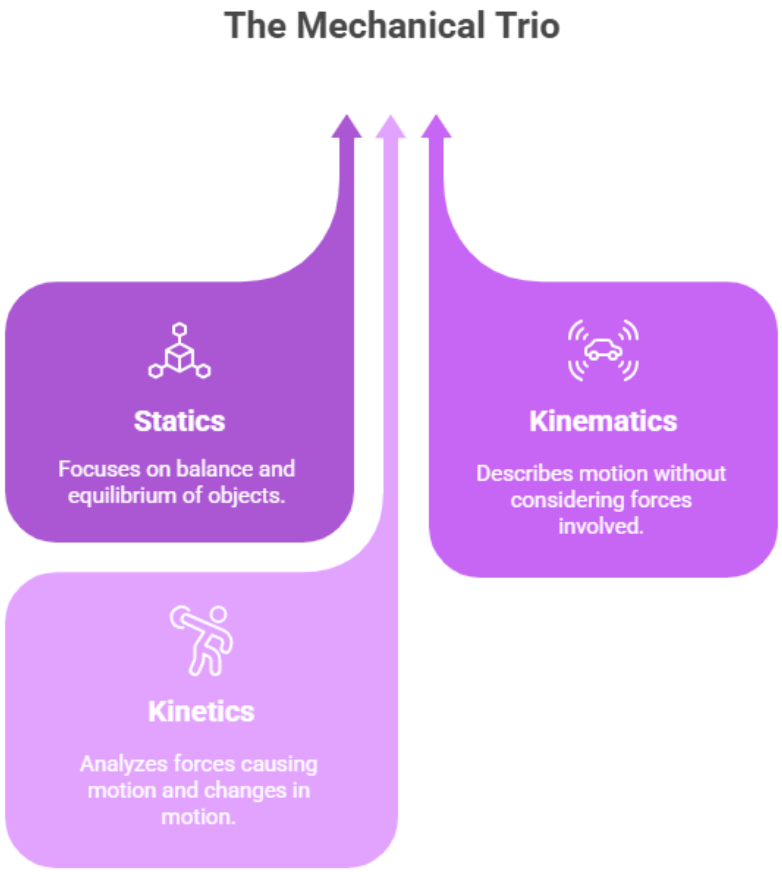
2. Dynamics – study of bodies in motion

Branches of Mechanics

1. Statics – balance and equilibrium

2. Kinematics – motion description (speed, velocity, acceleration)

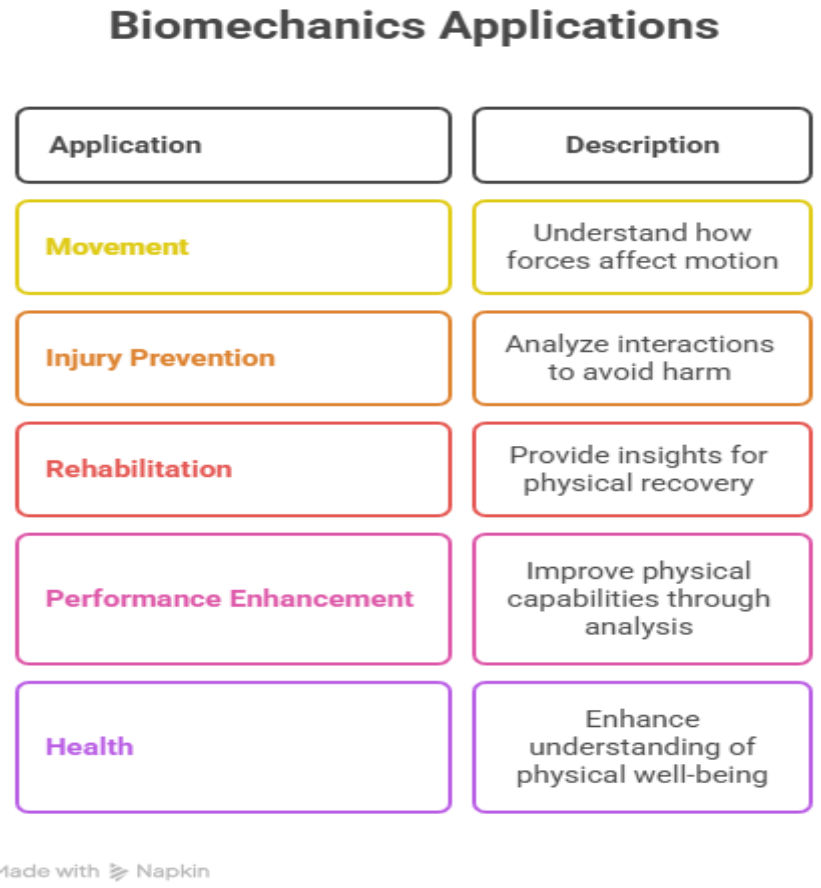
3. Kinetics – study of forces producing motion



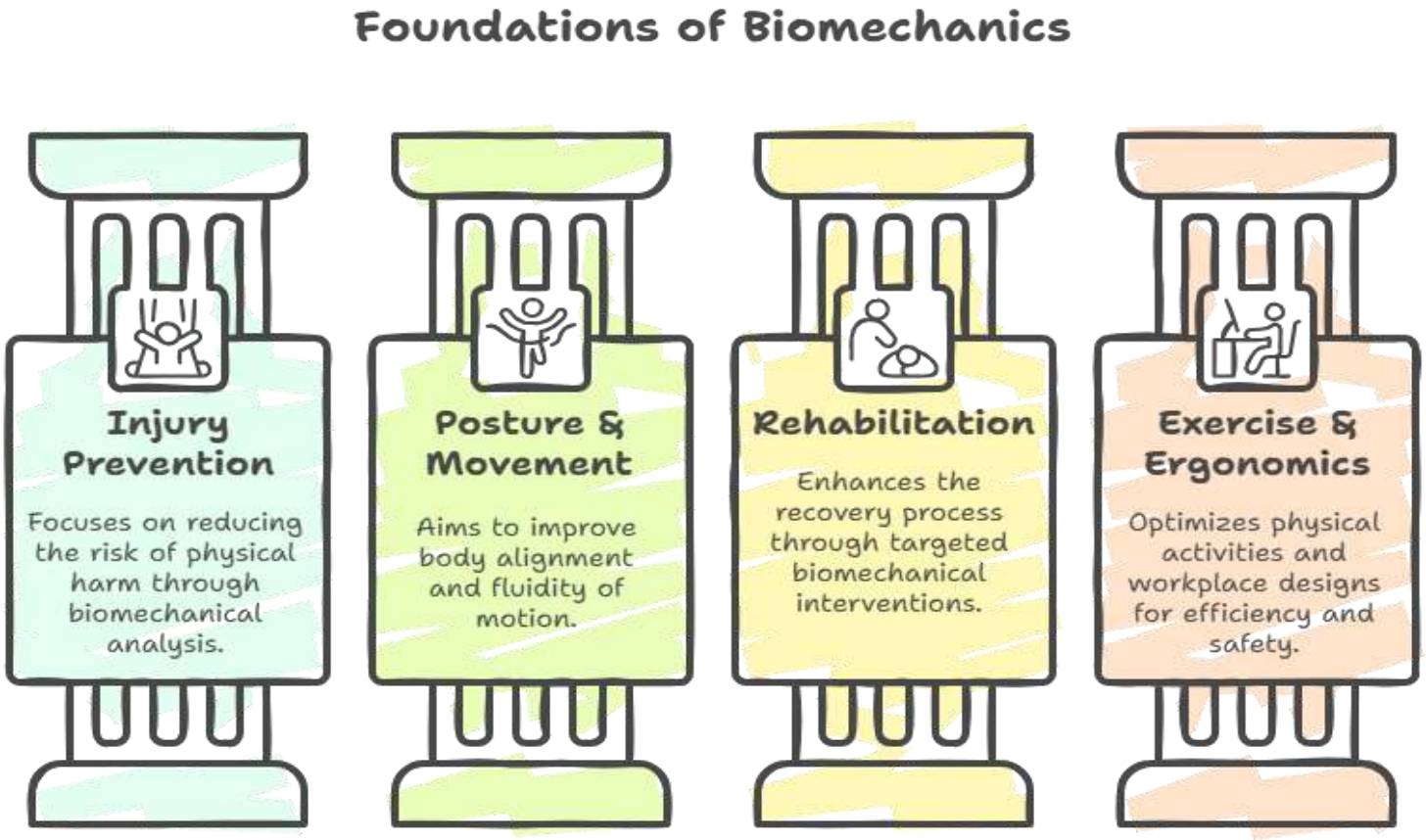
What is Biomechanics?

Application of mechanical principles to biological systems.

Helps in understanding how forces act on the human body.

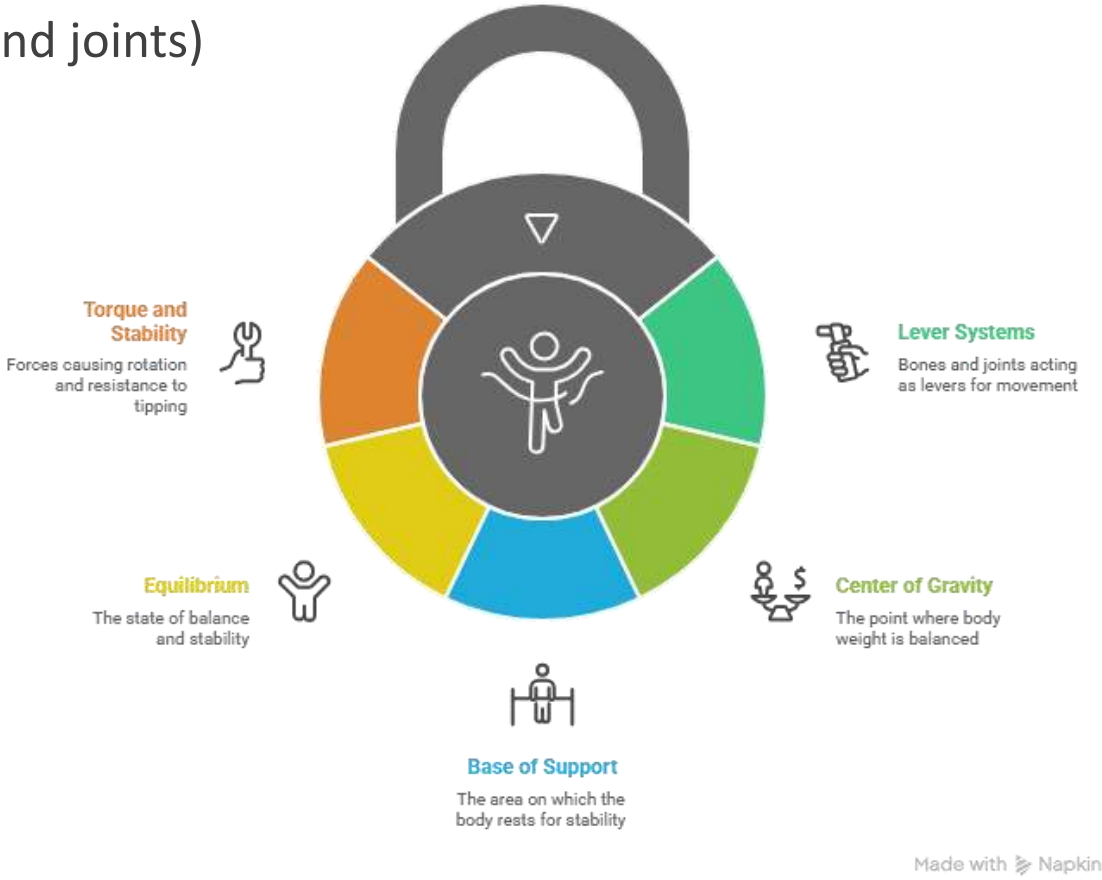


Importance of Biomechanics



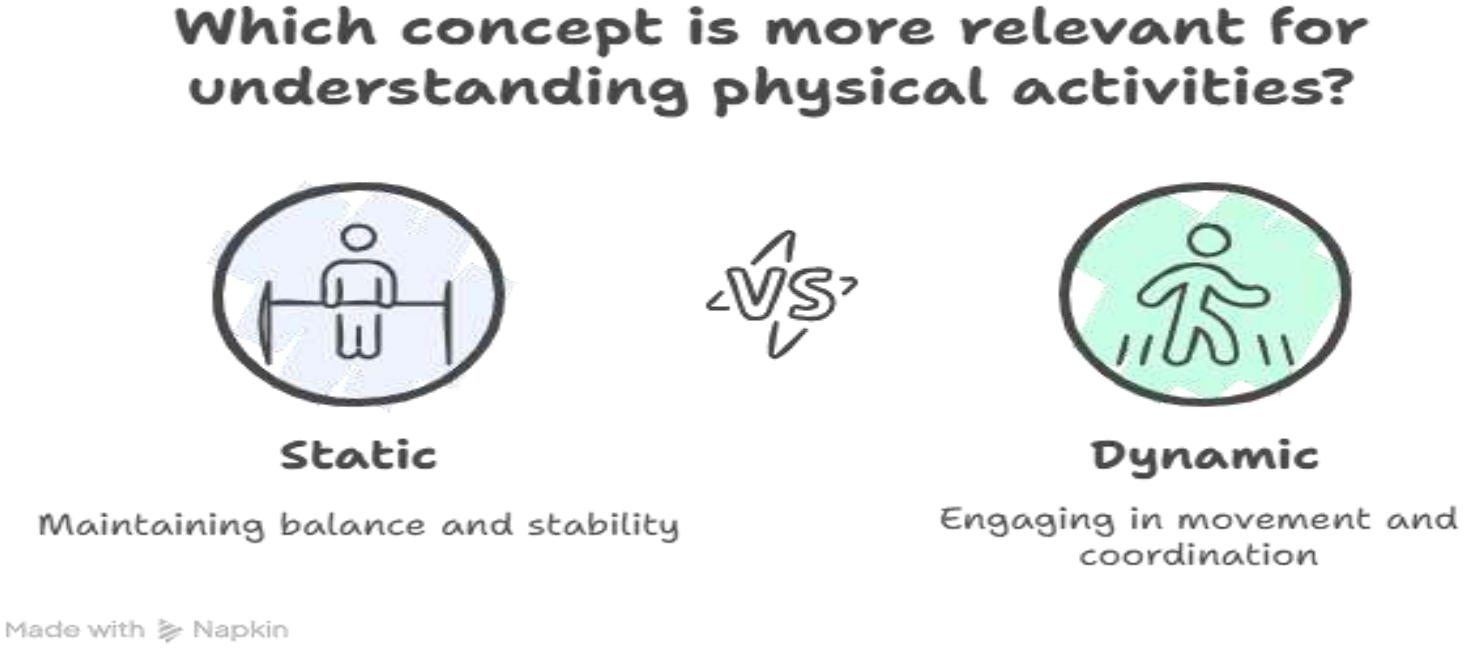
Mechanical Principles in Human Body

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



Static & Dynamic Concepts

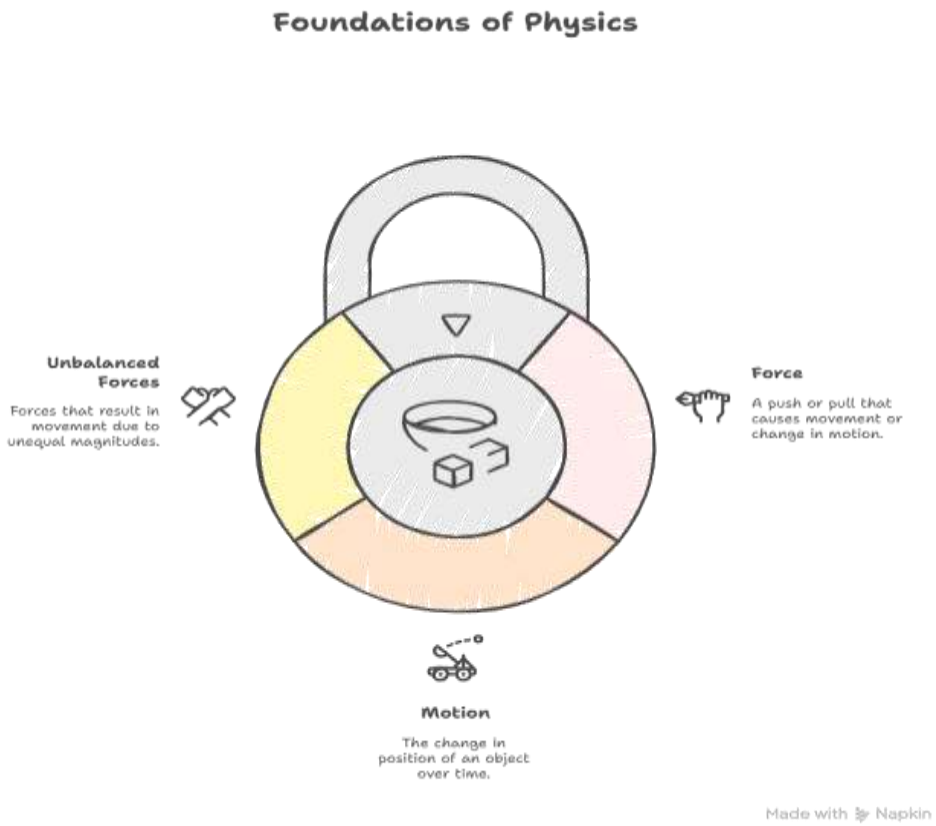
- Static: maintaining balance in standing
- Dynamic: movement during walking or lifting



Force and Motion

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

Motion occurs when forces are unbalanced.



Clinical Relevance

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

Summary

Mechanics + Biology = Biomechanics

Focus on: Force, motion, balance, stability.

Foundation for understanding human movement.

Learning Outcomes

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

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

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

- Identify mechanical issues involved.

- Which biomechanical principles apply?

- Suggest one movement correction technique.