ME6230: Mechanics of Human Movement

Week 12 Questions S Tarun Prasad - ME17B114

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1. What is voluntary stability zone?

Ans. It is the zone during which maximum stability is achieved while walking..

2. When is maximum stability achieved during walking?

Ans. When the load line is in front of the knee joint during heel strike and behind during liftoff, maximum stability is achieved.

3. What are some of the important requirements in a prosthesis knee?

Ans. Stability in stance phase, Swing Phase Control and Shock Absorption.

4. List ways through which stability in stance phase is achieved in a prosthesis knee?

Ans. Braking mechanism, Geometric stability, and Microprocessor Control.

5. Explain shank shortening effect

Ans. The effective shank length reduces increasing toe clearance when knee flexion occurs. This is known as the shank shortening effect.

6. Explain the pistoning effect.

Ans. The pistoning effect due to discomfort generated from a fixed brace.

7. Why is the joint pushed back in single-axis knees in some cases?

Ans. Insufficient force at heel contact due to weak hip muscles results in the joint being shifted a few millimetres posterior behind the load line.

8. Explain the difference between a single axis and polycentric knees?

Ans. A single-axis knee has a fixed centre of rotation while a polycentric knee has a mobile centre of rotation.

9. What does a polycentric knee do?

Ans. A polycentric knee uses a four-bar linkage to change the axis of the knee.

10. How is the moving axis of knee rotation in a polycentric knee useful?

Ans. The moving joint axis in a polycentric mimics the actual knee action thus providing more comfort than a fixed brace.